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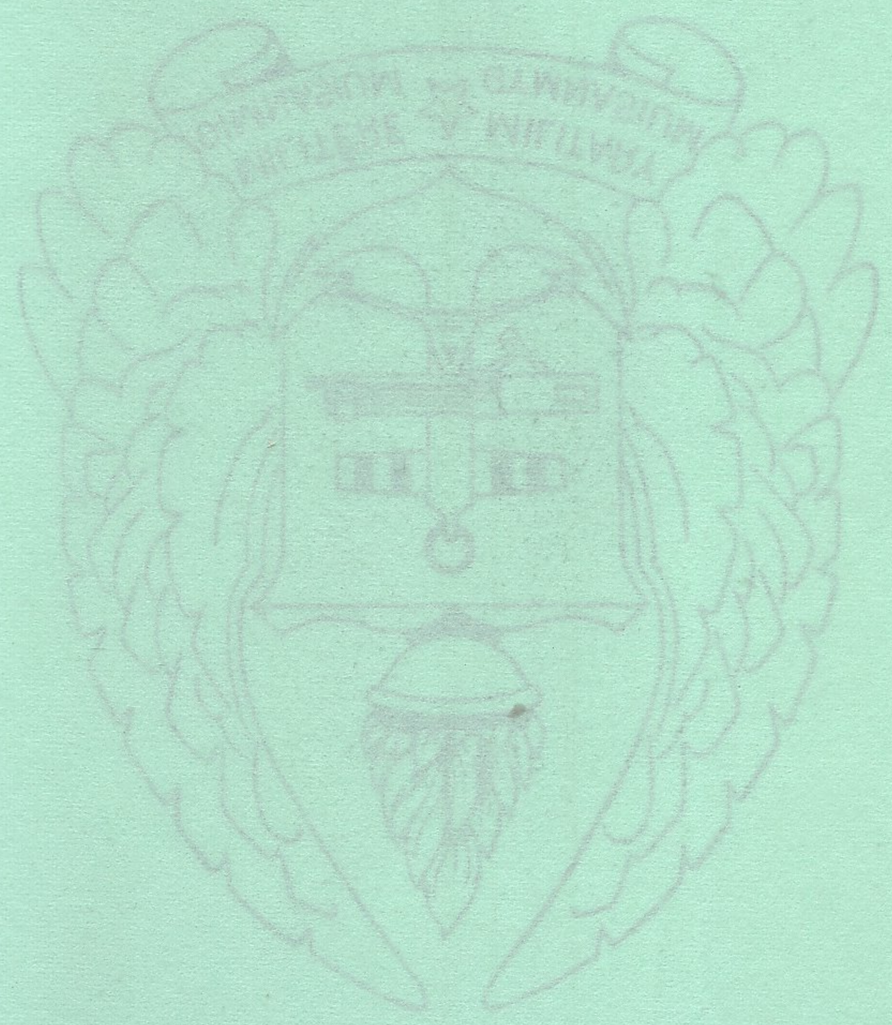
ARMY GYMNASIUM

VICKERS MMG

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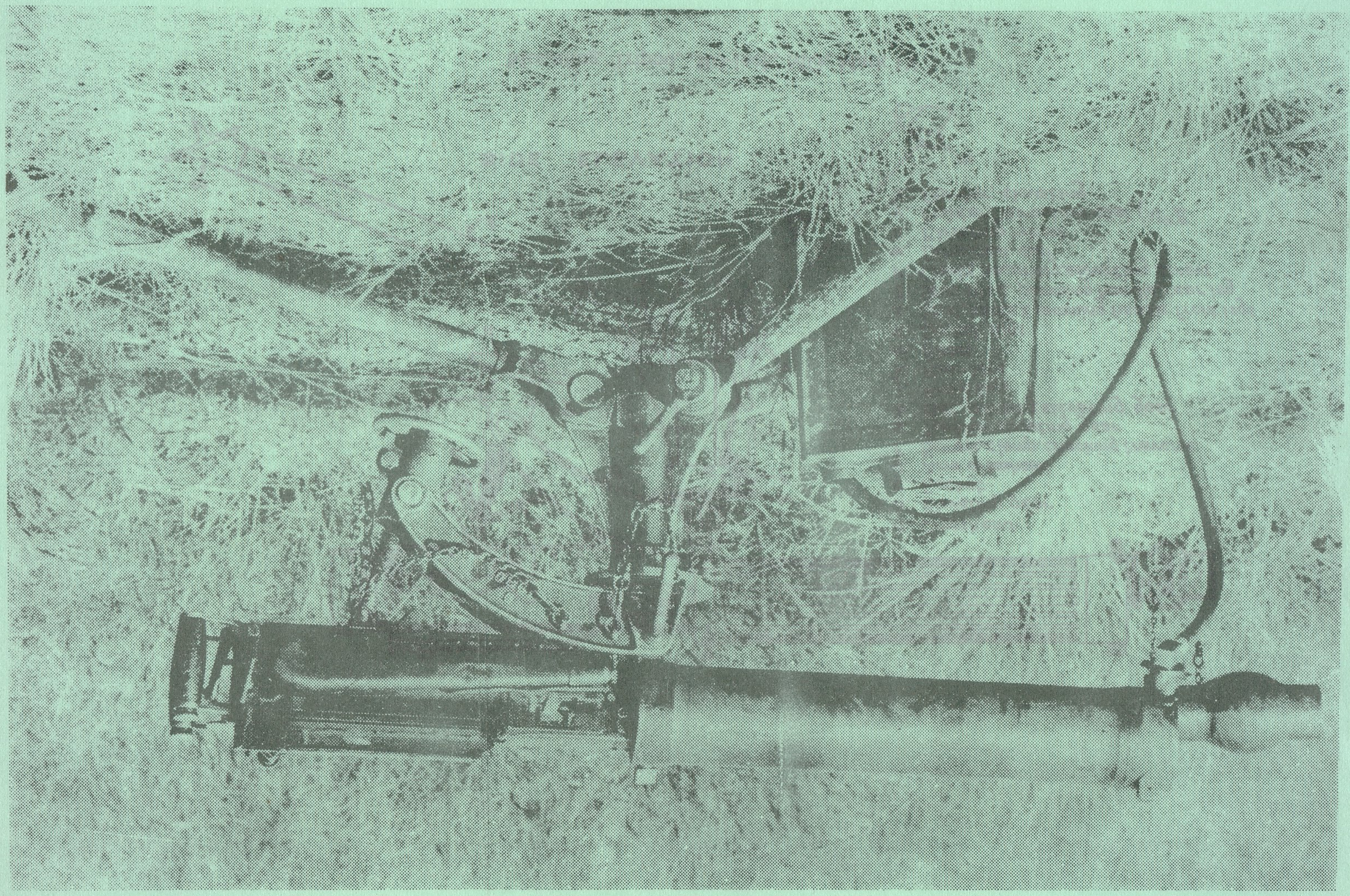
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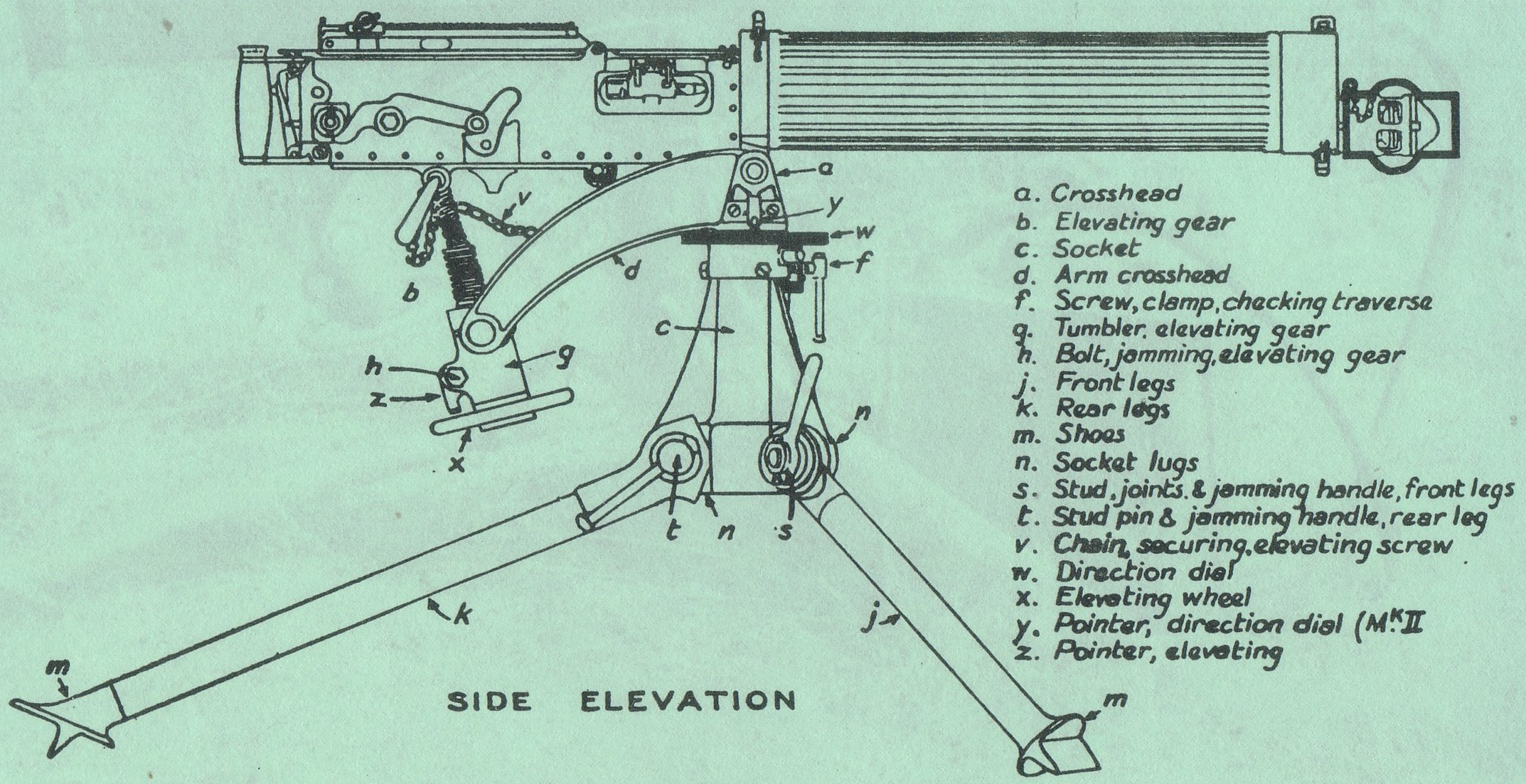
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ARMY GERMANY

THE





a. Crosshead
b. Elevating gear
c. Socket
d. Arm crosshead
f. Screw, clamp, checking traverse
g. Tumbler, elevating gear
h. Bolt, jamming, elevating gear
j. Front legs
k. Rear legs
m. Shoes
n. Socket lugs
s. Stud, joints & jamming handle, front legs
t. Stud pin & jamming handle, rear leg
v. Chain, securing, elevating screw
w. Direction diel
x. Elevating wheel
y. Pointer, direction diel (M.K II
z. Pointer, elevating

SIDE ELEVATION

Mounting, Tripod, .303-inch, MG, Mark IV

I N D E X

THE MEDIUM MACHINE GUN

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THE ARMY GYMNASIUM

CHAPTER I : INTRODUCTION TO THE .303 INCH MMG

LESSON 1

GENERAL DESCRIPTION

A. INSTRUCTOR'S NOTES

STORES

1. Gun, tripod ammunition liner, belt with drill cartridges, spare parts case, condenser can tube, gun chest, spare barrel, cleaning rod and blast deflector.

2. Wall diagrams are of value if obtainable.

PERIODS

One period.

PREPARATION

Gun mounted and all accessories laid out in their place. If two guns are available, on should be stripped and the recoiling portiens assembled on a table the gun casing being fitted into the gun chest. There will then be no need to strip and reassemble the gun as in para 4 + 5.

POINTS TO BE CONSIDERED DURING LESSON

In answering questions the instructor should be careful not to get involved in the subject matter of subsequent lessons.

INTRODUCTION TO LESSON

It is one of our three support weapons found in BN HQ manned by a team of three.

AIM

To introduce the weapon to the soldier and to give him a general idea of how it works.

B CONDUCT OF LESSON

THE GUN

1. Name - .303-inch Vickers medium machine gun.

/2. Weight .....

2. Weight - 40 lb (with water in barrel casing).

3. Rate of fire - about 500 rounds per minute.

FORCES WHICH WORK THE GUN

4. Describe how the gun is worked by two opposing forces :-

a. The explosion of the charge in the round which drives the recoiling portions back, and

b. The fusee spring, which forces the recoiling portions forward again.

PARTS AFFECTED BY RECOIL

Strip the gun to show the parts affected by the recoil. Show how they fit together by assembling them on a table. Emphasize the strength of all parts. The parts affected by the recoil are :-

Muzzle cup	Barrel	Right and Left side plates
Crank and crank handle		Fusee and spring
Connecting rod	Lock	Parts of the feed-block.

6. Reassemble the gun before continuing the lesson.

THE BARREL CASING

7. Describe the outside of the barrel casing, pointing out the following parts :-

Muzzle attachment. Blast deflector. Screwed plugs for filling and emptying. Adaptor for condenser tube and cork plug, Foresight.

WATER-COOLING SYSTEM

8. Explain that inside the barrel casing are the barrel and steam tubes. Use the diagrams and skeleton gun to show these to the squad.

9. Point out that the barrel is surrounded by water to keep it cool. Explain that the firing of the gun will heat the barrel which in turn heats the water and after firing about 500 rounds rapid the water will boil and give off steam.

10. Describe how the steam escapes from the barrel casing by means of the front or the rear hole in the steam tube depending on the position of the sliding valve. Show, using diagrams or a skeleton gun how, when the gun is fired with elevation, the valve covers the rear hole and allows the steam to escape through the front hole.

/Similarly .....

Similarly when the gun is fired with depression the valve covers the front and steam can escape through the rear hole.

11. Describe how the steam is carried from the steam tube, through the steam escape tube and then through the condenser tube into the condenser can. Explain that in order to condense the steam into water again, the can must be about two thirds full of water and the end of the condenser tube below the level of the water. If the end of the condenser is above the level of the water, the steam will escape into the air and the water will thus be lost.

BREECH CASING

12. Point out the following parts of the breech casing :-

Outside plates..	Bottom plate.
Front and rear covers.	Rear crosspiece.
Left side of casing:-	Front cover catch, fusee spring and box.
	Dial sight bracket. Left slide.
Right side of casing:-	Check lever.
	Right slide, collar and roller.
Rear cover :-	Tangent sight.
Bottom plate :-	Sliding shutter.
Rear crosspiece :-	Traversing handles. Safety catch.
	Thumb piece. Firing lever.

Show how the rear crosspiece is held in position by the fixing pin.

FEED

13. Explain that the gun is fed by a belt containing 250 rounds which passes through the feed-block from right to left.

TRIPOD

14. Point out and name the parts of the tripod :-

Legs and jamming handles.	Cross-head and pivot.
Socket.	Traversing clamp.
Direction dial	Elevating gear.

15. Demonstrate clamping up of legs.

16. Show method of fixing the gun to the tripod by the crosshead and elevating joint pins.

17. Demonstrate that the gun is elevated or depressed by the elevating gear and that the traversing clamp, when tightened, controls the traverse of the gun. Demonstrate that by loosening the traversing clamp

/fully .....

fully the crosshead can be removed from the socket. Show the pivot.

The weight of thetripod is about 50 lb.

GUN CHEST

18. Tell the squad that in transit, the gun is placed in the gun chest. Show how this is done and how the cleaning rod and spare barrel fit in the chest. When the gun is in the chest, the blast deflector is usually put on the strap of the spare parts case.

SUM UP

Main points.

CONCLUSION

1. Demonstrate and explain the correct sitting position behind the gun, knees bent out, heels together, elbows resting inside the thighs, first fingers over the top of the traversing handles, second fingers under the safety catch and third and little fingers around the base of the traversing handles. The thumbs resting lightly on the thumb-piece and the firer looking to the front. Demonstrate loading, firing and unloading. Explain that the squad will be taught these actions later, and they are only being shown for interest sake.

2. Questions to and from the squad. Don't expect the squad to remember the names of all parts.

LESSON 2

CHARACTERISTICS

A INSTRUCTOR'S NOTES

STORES

1. For lecture - Gun, tripod, dial sight, condenser can and tube, blastdeflector belt and liner.

2. For Demonstration - Gun, tripod, one spare gun in case of major breakdown. Spare parts case and box. Targets and dry ashes ± 50 rounds ammunision per man.

PERIODS

One period lecture. One period for demonstration.

PREPARATION

1. Guns must be carefully prepared.

2. Two instructors if possible.

INTRODUCTION TO THE LESSON

To employ the gun in the most efficient way, gunners must know what the gun can do, and what it cannot do.

AIM

To teach the soldier the capabilities and the limitations of the MMG.

B CONDUCT OF LESSON

CONCENTRATED FIRE

1. Explain that the first characteristic of the gun is its ability to produce concentrated fire - it can put a number of bullets into a small space. This is due to its fixed mounting and close grouping.

VOLUME OF FIRE

2. Explain that the high volume of fire is due to the belt feed, and that the volume is controlled by the length of burst and the rate of FIRE. A burstis always 25 rounds.

/RATES.....

RATES OF FIRE

3. Normal - One belt fired in approximately two minutes achieved by pausing for two seconds between bursts.

4. The accuracy of machine gun fire is due initially to the accurate ranges produced by the rangefinder and to the steadiness of the fixed mounting.

5. Tell the squad that accuracy can be maintained in darkness, fog or smoke by means of special instruments.

6. Due to its accuracy and to the instruments provided, the gun is able to fire :-

a. Over the heads of the infantry.

b. Indirect (explain briefly what this means).

c. Blinded by smoke or fog.

d. By night, if daylight preparations have been made.

SUSTAINED FIRE

7. Explain that the gun can maintain the high volume of fire for long periods due to its strong mechanism, belt feeding and water cooling.

LONG RANGE

8. The maximum range of the gun is 4,500 yards, but it is not normally required to fire over 2,000 yards. It can engage targets well beyond the reach of other low trajectory weapons.

FLEXIBILITY

9. Having 360 degrees traverse, the gun can engage targets in rapid succession over a wide area. Emphasize that flexibility depends to a large extent on good indication and recognition of targers.

MOBILITY

10. One section of guns, its ammunition and personnel are carried in two $\frac{3}{4}$ ton vehicles and $\frac{1}{2}$ ton trailers. In rough country it may have to be manhandled, and therefore its mobility is limited.

LIMITATIONS

11. Describe the limitations of the gun and the means of remedying or

/or.....

minimizing them as given below :-

a. Mechanical breakdown - good maintenance and handling.

b. The following points may enable the enemy to detect the position of a machine gun :-

Steam - use of condenser can.
Smoke - avoid excessive oil.
Muzzle-blast-use of blast deflector and wet sandbags, etc.
Flash - screen from flanks.

c. Weight of the gun and tripod is a limitation as regards manhandling.

DEMONSTRATION OF CHARACTERISTICS

12. Throughout the demonstration the instructor should give a commentary on the main lessons to be learned. He should use the demonstration to drive home the point he has made in his lecture.

Sequence of the demonstration and notes on its conduct are given below :-

Demonstrate :-		Method :-	Points to emphasize:-
a.	Service burst	fired at stopbutt. Belt spaced.	Importance of service burst and time to fire.
b.	Rates of fire	Belt not spaced.	Time of maintenace between bursts.
	a. Normal	Fired at stop-butt	
	b. Rapid	Belt not spaced. Fired at stop-butt	Time only for quick check of aim between bursts.
c.	Volume and accuracy	100 rounds straight at white screen	Size of group and volume of fire.
d.	Factors affecting accuracy.		
	i. Tripod not stamped in	100 rounds at screen	Compare size of group in each case.
	ii. Tripod stamped in	100 rounds at screen	
	iii. Loose jamming bolt	Prepare tripod by loosening the jamming bolt and tumbler nut. 50 rounds straight at screen.	

/iv. Punch .....

iv.	Punch fired	50 rounds straight at screen	
v.	Recruit fired	50 rounds straight at screen. Gun to be laid and loaded by instructor.	Emphasize that human element does not affect accuracy.

e. FLEXIBILITY

i.	Rapid engagement of targets.	3 coloured plates on stop-butt sufficiently spaced to mecessitate the use of the clamp in one switch.	Speed with which targets can be engaged.
ii.	Swinging traverse.	1 Belt along stop-butts. Condenser tube to be removed from can to show amount of steam given off.	Used in an emergency only. Rate of traverse 1 yd in 2 secs at 25 yds.

f. MUZZLE BLAST

i.	Ashes down, blast deflector off.	2 Bursts	
ii.	Wet sacks down	2 Bursts	Compare amount of dust caused by blast.
iii.	Blast deflector, no wet sacks	2 Bursts	

14. Every man should now be given a change to fire two bursts.

SUM UP

Main points.

CONCLUSION

Questions to and from the squad.

/CHAPTER 2 .....

CHAPTER 2 : GENERAL STRIPPING AND MAINTAINANCE OF THE GUN AND TRIPOD

INTRODUCTION

AIM

1. The aim of al stripping lessons is to teach the men the correct method of stripping the gun and its parts, so that they can maintain the gun and replace breakages as quickly as possible. The man is taught to strip the gun in a certain sequence.

This sequence should normally be adhered to, as it is devised to ensure that the gun or its parts are stripped rapidly and without damage.

COMPETITIONS AND TESTS

2. In all stripping competitions and tests. Precautions will be taken to avoid damage to the gun by carless handling.

THE MACHINE GUNNER'S MOTTO :-

3. "The more you do before you have to do it, the less you have to do when you have to do it".

/ LESSON 3.....

LESSON 3

GENERAL POINTS

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spareparts case and box and as many locks as are available.

PERIODS

One period.

PREPARATION

All tools removed from the case and the box and laid out on the table, the gun mounted in such a position that all the squad can see it.

INTRODUCTION TO THE LESSON

Before learning how to strip the gun there are certain general points which must be known, to avoid damage to the gun.

AIM

To teach the soldier the correct way of stripping the gun and its parts so that they can maintain the gun and replace breakages.

B CONDUCT OF LESSON

USE OF CORRECT TOOL

1. Explain and demonstrate the use of the correct tools for the job, eg, screwdrivers according to the size of screw and correct punches, according to the type and size of pins to be removed.

Point out that if this rule is not observed, screws and pins will get burred and the assistance of an armourer will be required to remove them.

SCREWED AXIS PINS

2. Tell the squad and demonstrate that when removing screwed axis pins, the threads must be fully unscrewed or they will be damaged.

/3. POint.....

3. Point out and demonstrate that when replacing screwed axis pins, the threads must be engaged without the use of force to avoid cross--threading.

FRONT AND REAR COVERS

4. Explain and demonstrate that before closing the front cover, the feedblock must be in position and the front cover catch raised, otherwise damage may occur to the front cover.

5. Explain and demonstrate that when raising the rear cover, it must be lifted under control. If it is thrown back, the hinge may be damaged. When the rear cover is lowered, the lock must be correctly placed in the gun.

SECURING CHAINS

6. Points out that parts secured by chains, eg, outer casing split pin, cork plug, must be removed by not pulling on the chains; otherwise the chains may be broken and a vital part lost.

USE OF HAMMER

7. Demonstrate the use and misuse of the Hammer, blows must not fall on the gun. Wood must always be placed over the part which requires a hammer blow.

FIRING THE LOCK

8. Explain that the firing pin must never be released unless the extractor is up against the extractor stop, or the striker may be broken.

9. State that the lock must be fired when it is in or out of the gun, except when the gun is loaded, to release tension on the lock spring.

10. Demonstrate, and practise the squad in firing and cocking the lock To fire the lock,the extractor must be fully raised all the time, and the tail of the sear depressed by pressing down the side levers head, until a click is heard. The tail of the trigger is then pushed to the rear and the firing pin will go forward.

11. To cock the lock, force the side levers head right up as far as possible, when the firing pin will be held to the rear.

SUM UP

12. Sum up main points and emphasize that with reasonable care defects and breakages in machine guns are of rare occurence. They are mainly due to neglect of ordinary precautions. /CONCLUSION .....

CONCLUSION

Questions to and from the squad.

/LESSON 4 .....

13

LESSON 4

STRIPPING THE GUN

A INSTRUCTOR'S NOTES

STORES

Gun, tripod and spareparts case.

PERIODS

One period.

PREPARATION

The necessary tools should be removed from the case and the gun mounted.

INTRODUCTION TO THE LESSON

Revise lesson 3.

AIM

To teach the soldier the correct way of stripping the gun.

B. CONDUCT OF LESSON

REMOVE THE LOCK.

1. Explain and demonstrate that the gun is unloaded, the crank handle pulled back on to the roller and the rear cover raised. The thumb or first finger of the left hand is placed between the extractor and stop and the right thumb on the milled base of the connecting rod. The crank handle is allowed to move slightly forward so that the lock can be lifted clear of the side plates and breech casing. The lock can then be turned slightly and removed from the connecting rod.

When the lock has been removed, the crank handle is allowed to move forward under control on to the check lever. While this is taking place, the right thumb, by bearing on the milled base of the connecting rod, prevents the connecting rod from fouling the bottom of the breech casing.

The rear cover is then closed, and the lock fired.

MUZZLE ATTACHMENT

/2. Explain .....

2. Explain and demonstrate that the split pin is withdrawn and the blast deflector removed. The outer casing can now be turned and removed. Finally the muzzle cup is unscrewed by means of the combination tool and removed.

FEED BLOCK

3. Raise the front cover, lift out the feed block, and close and lock the cover.

FUSEE SPRING AND FUSEE

4. Describe and demonstrate that with the right hand at the rear of the fusee box and the left hand at the front, the box is pressed forward until it is clear of the studs and then removed; the spring is then disconnected from the fusee chain.

5. The fusee is turned to the rear, until the lugs on the stem are free, and then withdrawn.

RECOILING PORTIONS

6. Explain and demonstrate that the rear cover is raised, the fixing pin is unscrewed and the rear cross-piece lowered. The right and left slides are then removed and the barrel and side plates withdrawn. The side plates are then disconected, the left one first.

7. With the gun stripped, complete the description of the parts.

ASSEMBLING THE GUN

8. Describe and demonstrate assembling the gun. All that this in fact entails is reversing the operations of stripping the gun.

9. Ensure that when assembling the barrel and side plates, the the radial groove is uppermost and that no force is used. If the side plates are not home on the barrel trunnions and crank shaft, the barrel must not be placed in the gun, otherwise burrs on the crank shaft may occur.

PRACTICE

10. Practice the squad in stripping and assembling the gun individually, the rest of the squad watching for errors.

In order to make sure that the squad learn the names of the parts, it is advisable to make them name all parts as they are handled.

/11 Initially .....

11. Initially it is desirable to make the men place the parts in order as they remove them, but later as they become more practised the instructor should mix them up and require the squad to select the correct parts themselves when assembling the gun.

SUM UP

Sum up sequence of stripping and assembling.

CONCLUSION

1. Question's to and from the squad.

2. If time allows, small competitions are of value.

/LESSON 5 .....

16

LESSON 5

STRIPPING THE LOCK

A INSTRUCTOR'S NOTES

STORES

As many locks as are available with punches No 5 of T fixing pins.

PERIODS

One period.

INTRODUCTION TO THE LESSON

Breakages or damage to parts of the lock are the most common casualties when carrying out prolonged shoots. In order that the gun may be kept in action, rapidity and accuracy in stripping and assembling the lock are most important.

AIM

To teach squad correct way of stripping lock.

B CONDUCT OF LESSON

STRIPPING THE LOCK

1. Explain and demonstrate the method of stripping the lock, the squad imitating stage by stage. Name parts of the lock as they are removed.

2. The method of stripping the lock is as follows:-

The lock is cocked. Using a punch No 5 or the T fixing pin, the bush axis pin and bush axis are forced out. The side levers, extractor levers and extractor can be removed.

Again with punch No 5 or T fixing pin, the tumbler axis pin is pushed out and the tumbler removed. By pressing on the tail of the sear, the lock spring can be released and the trigger axis pin, trigger and lock spring taken out. Again pressing on the tail of the sear, the firing pin can be shaken out and lastly the sear and spring removed.

3. Question the class in the names of parts. All parts should have been laid out on the table in the order in which they were removed. The instructor should then complete the detailed description of the parts of the lock.

/ASSEMBLING .....

ASSEMBLING THE LOCK

4. Explain and demonstrate, with the squad imitating, the method of assembling the lock. This is done by reversing the process of stripping with the following exceptions :-

a. The tumbler is replaced before the trigger.

b. The lock spring is forced home, the long arm towards the extractor when the lock is in the fired position and when all other parts are assembled.

PRACTICE

5. Practise the class in stripping and assembling the lock. When the class are making good progress, mix up the parts before they are assembled.

6. If time allows, practise the class in stripping and assembling blindfolded.

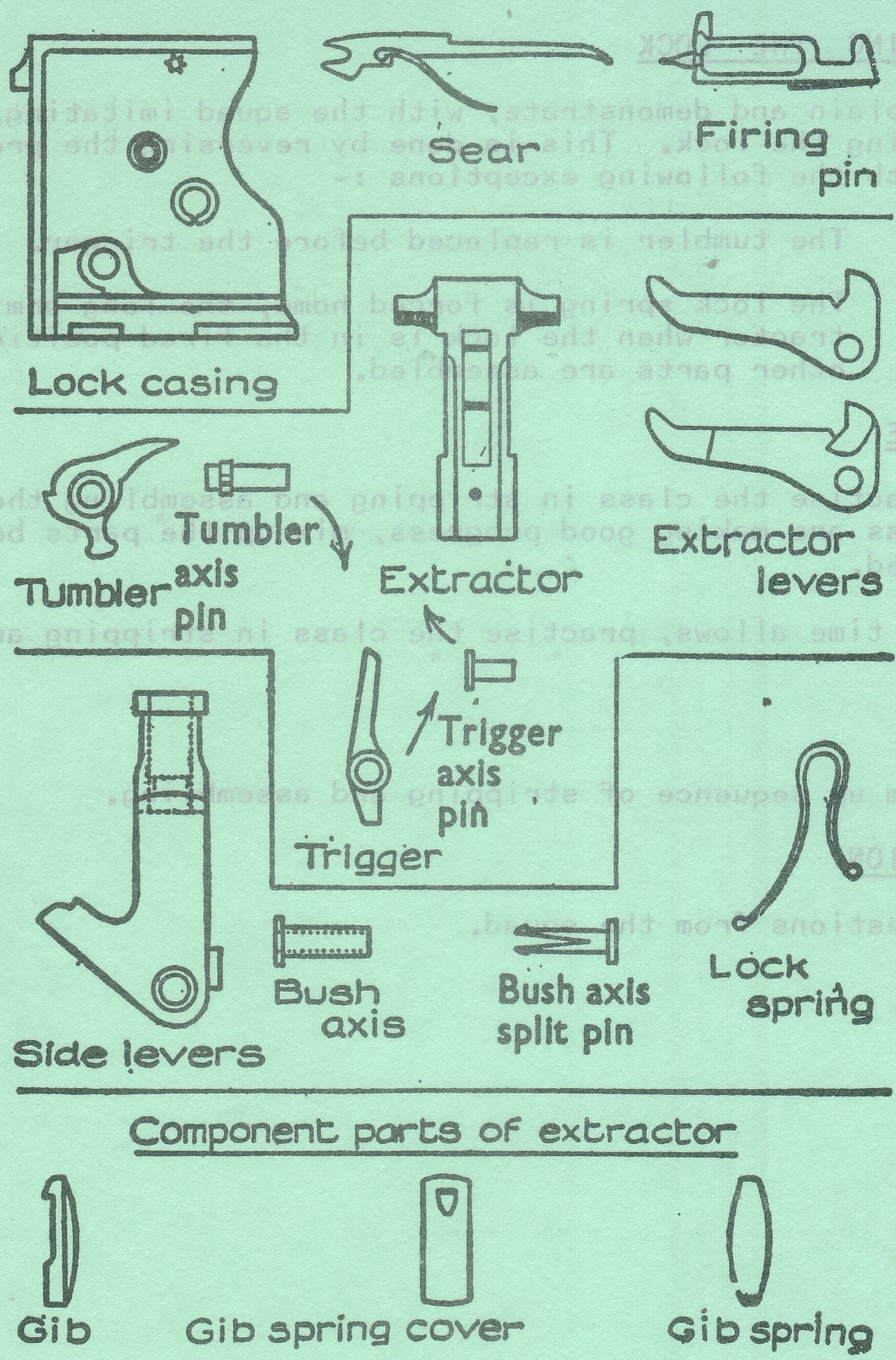
SUM UP

Sum up sequence of stripping and assembling.

CONCLUSION

Questions from the squad.

/LESSON 6.....



Component parts of extractor

—Components of lock

LESSON 6

STRIPPING THE FEEDBLOCK

A INSTRUCTOR'S NOTES

STORES

As many feedblocks as available, hammer, pliers, T fixing pins and punches No 5.

PERIODS

One period.

AIM

To teach squad correct way of stripping feedblock.

B CONDUCT OF THE LESSON

STRIPPING THE FEEDBLOCK

1. Explain and demonstrate, the squad imitating stage by stage, stripping the feedblock. Name parts as they are removed.

2. To strip the feedblock, the split pin holding the top and bottom levers must be forced out using the T fixing pin No 5 Punch and hammer, and the top and bottom levers separated. The slide will now come out and the pawls and spring can be removed. The bottom pawls axis pin must be extracted with the pliers and the spring and pawls taken off.

3. With the feedblock stripped, complete the description of the parts.

ASSEMBLING THE FEEDBLOCK

4. Explain and demonstrate, with the squad imitating stage by stage, the method of assembling the feedblock, which is merely to reverse the above operations.

5. Further practice should be given in stripping and assembling.

SUM UP

Sum up sequence of stripping and assembling and discuss progress made.

CONCLUSION

/1. Questions .....

1. Questions from the squad.

2. Questions to squad on names of parts.

/LESSON 7 .....

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LESSON 7

STRIPPING COMPONENT PARTS

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, sparepartsbox and case and asmany extractors as available.

PERIODS

One period.

PREPARATION

1. The neccessary tools should be laid out on the table.

2. Get two members of the squad to strip the gun and lock and lay the parts on the table. Question the remainder of the squad on the names of the parts handled.

INTRODUCTION TO LESSON

This lesson deds with the stripping and assembling of a number of small parts which may on occasion have to be stripped for cleaning and replacement.

AIM

To teach squad how to strip component parts.

B CONDUCT OF LESSON

STRIPPING COMPONENT PARTS

1. Explain and demonstrate the method of stripping and assembling the parts given below. Practise the squad after each stage.

   a. Front cone- The front cone is unscrewed by means of the combination tool.

   b. Packing gland - The packing gland is unscrewed by means of the combination tool. When assembling, the gland must be screwed fully home.

   c. Front cover catch - The plug must be pushed inwards and given

/a .....

a quarter turn with a screwdriver. If pressure is released, the spring will force the plug out. Before the plunger is removed, it must be turned so that the slides are free to pass the lugs in the catch.

d. Extractor - If the gib slide is pushed out with a punch, the spring and gib can be removed.

e. Tangent sight - The axis pin must be unscrewed and removed. The tangent sight, pistion and spring can then be taken off.

f. Rear cover lock - The axis pin must be unscrewed and removed. The rear cover lock can be lifted off and the spring pushed out with a punch.

g. Trigger bar - When the rear lock is off, the trigger bar and spring can be removed.

h. Roller - The split pin is removed with pliers and the collar and roller will then slip off.

j. Sliding shutter - The catch must be depressed and the shutter moved to the front until it is up against the stop.

If the plunger is then pushed in with a No 3 punch, and the catch pushed in, the shutter can be moved forward until it is clear of the breech casing.

2. Practise the squad in stripping and assembling all component parts.

SUM UP

Sum up component parts to be stripped.

CONCLUSION

Questions to and from squad.

/LESSON 8 .....

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LESSON 8

CLEANING

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spareparts box and case, condensor can and tube, cleaning rod flannelette and cleaning materials.

PERIODS

One period.

PREPARATION

Gun and tripod mounted, with the rest of the kit laid out on a table.

POINTS TO BE CONSIDERED DURING LESSON

"The more you do before you have to do it, the less you have to do when you have to do it".

INTRODUCTION TO LESSON

For the gun to functior satisfactorily under all conditions, its maintenance is of the first importance. The degree of cleaning carried out depends on the employment of the gun. In barracks, when the guns are probably not in use daily, the amount of cleaning need not be more than an occasional oiling. On active service, however, conditions will decide how ofter the gun is cleaned.

AIM

To teach the method of cleaning the gun and tripod.

B CONDUCT OF LESSON

CLEANING

1. When guns are not continually in use, cleaning will consist of wiping over the outside of the gun and tripod, and all parts of the mechanism that can be reached without stripping, with an oily rag, and the inside of the barrel oiled. If the gun has been fired and then returned to store, the barrel will need cleaning daily for several days For this the cleaning rod or double pullthrough can be used.

/2. Explain .....

2. Explain, with the squad practising, that the gun will be stripped, and a piece of flannelette (4x2) placed in the eye of the cleaning rod and the rod pushed through the barrel several times. The muzzle protector will always be on the barrel when it is cleaned. This process will be repeated with fresh pieces of flannelette until the bore is cleaned. Then a piece of flannelette (4x1$\frac{1}{2}$) will be oiled and pushed through the barrel.

3. If the barrel cannot be cleaned with flannelette alone, the double pullthrough and gauze will be used. Before using the pulltrhough, examine it to see the weight is not bent, the cord is in good condition the gauze is oiled and the muzzle protector is on the barrel.

Thread the pullthrough through the barrel form the breech end, and with one man holdign the barrel behind his back and underneath his armpits, and with one man on either end of the pullthrough, it will be pulled backwards on forwards through the barrel, the cord being kept taut to prevent wear on the breech. After using the double pullthrough, the barrel is cleaned with the cleaning rod and flannelette and re-oiled.

4. Practice the squad using the double pullthrough.

5. Periodically the gun should be completely stripped down, and all parts left clean and dry for inspection. If on inspection any part of the gun and tripod is found to be rusted, the rust will be removed by using flannelette soaked in parafin. After cleaning off the rust all traces of paraffin must be removed and the parts well oiled. After inspection all parts should be oiled and reasembled.

6. Spare parts and remaining guns stores should also be examined and checked for damage, cleanliness and deficiencies.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

LESSON 9

DESCRIPTION AND PACKING OF SPARE PARTS

A INSTRUCTOR'S NOTES

STORES

Gun and tripod, spareparts box and case.

PERIODS

One period.

PREPARATION

Mount the gun near the table so that everyone can see. Check the contents of the spare parts case and box.

INTRODUCTION TO LESSON

Explain that generally speaking the parts that are most frequently required are contained in the spare parts case. There is one spare parts to each gun. The spare parts box, of which there is one to each section contains a reserve of spare parts and certain additional spares which are not so frequently required.

AIM

1. To teach the names and use of the various spare parts carried so that should a part of the gun be broken or damaged, a spare part can be obtained with the minimum of delay.

2. To teach the correct method of packing the spare parts.

B. CONDUCT OF LESSON

SPARE PARTS CASE

1. Put all the contents of the spare parts case on the table.

2. Name each of the parts in the spare parts case and state the number carried, and order various members of the squad to pick op the parts from the table.

3. The following are the contents of the spare parts case :-

/Contents .....

CONTENTS OF SPARE PARTS CASE

Balance, spring	1
Can, oil	1
Extractors	2
Lock, breech	1
Plug, clearing	1
Spring, fusee	1
Wallet	1
Tool combination	1

WALLET

4. Name each of the parts contained in tha wallet, and state the number carried. Ask various members of the squad to pick up the parts from the table and indicate where they would go on the gun.

5. The following are the contents of the wallet :-

CONTENTS OF THE WALLET

Bottles, oil, Mark 4 or 5	1
Cork for plug	1
Cup, muzzle attachment	1
Disc, muzzle attachment	1
Fusee, with chain	1
Levers, bottom	1
" top	1
Packing asbestos, 5-yard pieces	1
Pins, split, lever feed block	1
" trigger lock	1
" tumbler	1
" firing	2
" keep split, $\frac{1}{8} \times 2\frac{1}{2}$ inches (for Mark 4 tripod mounting)	3
Pliers, side cutting, pairs	1
Protector, muzzle	1
Pull-through double	1
Punches, No 3	1
" No 5	1
Screwdrivers, small	1
SEar, with spring	1
Spring lock	2
Trigger	1
Tumbler	1
Whaser, adjusting No 1, .003-inch	3
" " No 2, .005-inch	3
Wire guaze (pieces)	2
Washers leather	1

/6 Show..

6. Show how to pack the contents of the spare parts case. All the contents of the wallet go into the rear pocket of the wallet with the exception of the screwdriver and pliers which fit into the front pocket. The wallet is then fastened with its strap and pushed into the case. The oil can then be pushed down in front of the wallet and the clearing plug, combination tool and the fusee spring stood on end alongside the oil can. The extractors can then be placed in, and the balance spring pushed into a fold of the wallet. Finally the lock can be placed flat on its side on top and the case fastened with its strap.

SPARE PARTS BOX

7. Put all the contents of the spare parts box on the table.

8. Name each of the parts contained in the spare parts box, and state the number carried. Detail, one of the squad to pick the parts from the table and indicate where they would go on the gun or what tools would be used for various operations.

9. The following are the contents of the spare parts box:-

Blocks, feed, RH	2
Boxes, patch, first aid complete	1
Boxes, small parts	2
Brushes, oil, MG	1
Bush, axis, side levers	1
Chains, crosshead joint	1
Collars, roller	1
Corck for plug	2
Cups, muzzle attachment	1
Discs, muzzle attachement	4
Fusee, with chain	1
Gib	1
Hammer	1
Lever, extractor, left	1
" " right	1
Packing, asbestos (5-yards pieces)	8
Pins, crosshead joint	1
" elevating joint	1
" Split, keeper 1/16-in x 1-in	3
" trigger lock	1
" tumbler	1
" firing	4
" split, collar, roller	2
" split, keeeper 1/8-in x $2\frac{1}{2}$ inches (for Mark 4 tripod mounting)	6
" split, bush, axis, side lever	1
" muzzle attachment	1
/Pins	

Pins T fixing rear cross-piece	1
Plugs, cork, complete	1
" screwed	1
" front cover catch	1
Plungers, front catch	1
Roller	1
Screws, clamp checking traverse	1
Sights, fore	1
" tangent	1
Spanner, adjustable	1
Springs, bottom pawl	2
" rear cover lock	4
" front cover catch	2
" gib	2
" lock	8
" safety catch with piston	4
" sear	2
" shutter catch	2
" tangent sight	1
" top pawls feed block	4
" trigger bar	4
Washers, adjusting No 1	4
" " No 2	4
" elevating nut (tripod Mk 4)	6
Wire guaze (pieces)	8

10. Show how to pack the contents of the spare parts box. The feedblocks, hammer tangent sight, adjustable spanner, muzzle cup and discs fit into their respective brackets in the box. All the small spare parts, pins springs, etc, go into the small tins which fits in the slots on the side of the box, and the remainder of the spares loose in the box.

11. Practice the squad in packing the spare parts case and box.

SUM UP

Sum up.

CONCLUSION

Questions to and from the squad.

/LESSON 10 .....

LESSON 10

REPAIR

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spareparts case and box, patch first aid, and a portable blackboard.

PERIODS

One period.

POINTS TO BE CONSIDERED DURING LESSON

NB - The lateral adjustment of the foresight should only be carried out by experienced officers and NCOs.

INTRODUCTION TO LESSON

AIM

1. To teach the soldier how to fit spare discs to the muzzle attachment.

2. To teach the soldier how to repair damage to the barrel casing.

3. To teach officers and NCOs the mehtod of dealing with a damaged or displaced foresight.

B CONDUCT OF LESSON

FITTING SPARE DISCS TO THE MUZZLE ATTACHMENT.

1, Tell the squad the metal discs wear out and are liable to damage.

2. Explain and demonstrate the method of replacing metal discs, The front cone is unscrewed and the edge of the disc is cut pushing up sufficient metal to form a hold for the pliers. The disc is then removed with the pliers and replaced with a new one. In replacing the disc, it may be necessary to tap it on to the front cone.

3. The squad cannot be practised in this as it will entail damagae to the discs.

PERFORATION OF THE BARREL CASING

4. Tell the squad that should the barrel casing be pierced by bullets /or.....

or other means, the gun will be put out of action. Semi-permanent repairs will be carried out by an armourer at the first opportunity, but to enable the gun to be in action again with the least possible delay temporary "first aid" can be carried out by the gun team.

5. Explain and demonstrate how to repair an imaginary hole in the barrelcasing. A rubber pad from the tin box in the spare parts box is forced over the hole. The metal plate is positioned on top of this and the whole fixed firmly to the barrel casing by means of the flexible clips provided.

6. State that a hole in the front cap of the barrel casing cannot be repaired in this manner, but a fairly water-tight repair can sometimes be effected by hammering in a wooden plug.

7. Practise the squad in carrying out first aid on the barrel casing.

LATERAL ADJUSTMENT OF THE FORESIGHT

8. Tell the squad that if the foresight has been damaged or displaced lateral re-adjustments will be necessary. This will be carried out on the 30-yards range.

9. State that a target is required with a thick vertical line as an aiming mark and a thin pencilled line 5/8-inches to the right of the centre of the thick line. Draw this on the blackboard and set it at suitable distance from the gun.

10. Say that the socket of the tripod must be perfectly upright and setting-in bursts fired into the stop butts. To avoid error caused by holding, the gun is punch fired, the belt being spaced in 10-round groups.

11. Demonstrate and teach punch firing. The gun is half-loaded and, with the thumb-piece pressed, a punch is inserted between the safety catch and the firing lever. The gun is then laid accurately on the thick line with the sights set at 400 yards. If the crank handle is now pulled back, the belt pulled and the crank handle released the gun will fire a burst of 10 rounds. The aim is now re-checked to see that the tripod has not moved. The punch is removed and the gun unloaded and cleared.

12. Show on the blackboard that if the gun is correctly sighted, the MPI will fall on the thin pencilled line.

13. Demonstrate that if there is any error, the foresight is tapped in the same direction as the error, using a hammer and a No 3 punch.

14. State that another burst of 10 rounds will be fired after each adjustment until sighting is correct. Adjustments are very fine and great care must be exercised in tapping the foresight. When the foresight is

/very .....

very tight, the bracket must be supported to prevent it being jarred loose.

15. Practise the squad by marking imaginary MPIs on the blackboard and having the squad adjust the foresight accordingly.

SUM UP

Sum up main points.

CONCLUSION

Questions to and from the squad.

/LESSON 11 .....

LESSON 11

BARREL LIFE

A INSTRUCTOR'S NOTES

STORES

MMG History sheets.

PERIODS

One period.

INTRODUCTION TO LESSON

The knowledge of the probable life of a barrel is of assistance to an MMG Platoon Commander in estimating the number of barrels required for a prolonged shoot, as it affects safety.

AIM

1. To teach how to determine the probable remaining life of a barrel.

2. To teach how to compile MMG history sheets.

B CONDUCT OF LESSON

RELIABILITY OF BARREL

1. The following facts have been obtained over a prolonged period and the firing of millions of rounds.

   a. In the case of a low rate of fire with regular and continuous cleaning and oiling, and where water in the barrel is not boiling continuously, the average life of a barrel for overhead fire is about 20,000 rounds.

   b. In the case of rapid and continuous fire, the life is between 12,000 and 15,000 rounds for overhead fire.

   c. When computing the number of barrels required for an operation the life of a barrel may be taken (as rough guide) at 15,000 rounds, but if overhead safety is involved nota para 2.

   d. For fire other than overhead fire the average life is about 25,000 rounds.

RULE FOR OVERHEAD SAFETY

/2. Rule .....

2. Rule two of overhead safety is that tripods must be in good conditions and barrels should not have fired more than 12,000 rounds. Therefore when preparing to fire overhead safety there must be a check of those barrels to be used to ensure that they have not fired in excess of 12,000 rounds.

MMG HISTORY SHEETS

3. State that the MMG history sheet provides an accurate and easily compiled method of recording :-

a. The number of rounds.

b. Any casualties sustained by the gun.

It is the responsibility of the no 1 under the supervision of the section commander to maintain the history sheet for his gun and enter it up at the end of each period of firing.

4. Explain that one book is used for each gun and describe briefly how to enter it up.

5. A suggested proforma is shown on the next page.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

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DAILY RECORD OF ROUNDS FIRED
DAGREGISTER VAN SKOTE GEVUUR

Date Datum	Barrel 1 Loop Number of Rounds Getal skote	Barrel 2 Loop Number of Rounds Getal skote	Signature Handtekening	Date Datum	Number of Rounds Getal skote	Signature Handtekening

33

LESSON 12

CHANGING THE BARREL WITHOUT DRAINING THE BARREL CASING

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spareparts case and cloth for making plug. If available, two guns should be used to ensure maximum practice.

PERIODS

One period.

PREPARATION

Barrel must be packed and barrel casing filled with water.

POINTS TO BE CONSIDERED DURING LESSON

INTRODUCTION TO LESSON

1, The necessity for saving water depends entirely on the prevailing conditions. In tropical coutries water is often very scarce. Under active service conditions getting more water may often endanger a man's life or give away the gun position. On active service, therefore, every care should be taken to conserve the supply of water with the gun.

2. After firing a number of rounds, the barrel may become worn and require changing. In barracks or billets, where a supply of water is available this merely entails draining the barrel casing, changing the barrel and refilling the casing.

3. Should however, the barrel require changing during a shoot, a more rapid method and one less wasteful of water has been devised.

AIM

1. To impress upon the squad the importance of conserving the water supply at the gun.

2. To teach the method of changing the barrel without draining the barrel casing.

/B. CONDUCT.....

B. CONDUCT OF LESSON

CHANGING THE BARREL WITHOUT DRAINING THE BARREL CASING

1. Tell the squad that the normal sequence of stripping is followed until the slides have been removed. It should be noted that most parts would normally be hot and the instructor should not allow the muzzle attachment or the barrel, for example, to the handled with bare hands.

2. Detail two men as Nos 1 and 2 get the gun stripped as in para 1.

3. The next stage is to remove the elevating joint pin, depress the gun and replace the elevating joint pin in the gun bracket.

4. Teach the duties of No 2, who must prepare a plug for stopping-up the front end of the barrel casing by wrapping a piece of cloth around the end of a clearing plug or other suitable implement. Explain that the No 2 must insert the plug in the muzzle of the barrel and, as the recoiling portions are withdrawn, follow the barrel with the plug in order to close the hole at the front end of the barrel casing.

5. Explain the duties of No 1. The No 1, when the No 2 is ready, withdraws the recoiling portions, lifts the barrel clear of the breech casing and by opening the side plates, allows the old barrel to drop clear.

6. Explain that to place the new barrel in the gun is merely the reverse of the above operations. Emphasize that the No 1 must be careful not to damage the front packing when replacing the barrel and that the No 2 must not remove the plug until it is pushed clear by the end of the barrel.

The gun must not be levelled until the barrel and sideplates have been replaced or water may leak out of the rear end of the barrel casing.

7. Nos 1 and 2 should now complete the reassembling of the gun.

8. Practise the squad in pairs in changing the barrel.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/CHAPTER 3.....

CHAPTER 3

MECHANISM

INTRODUCTORY NOTES

AIM

1. The aim of all mechanism lessons is to teach the soldier how the mechanism of the gun operates.

INSTRUCTORS NOTES

2. Throughout all mechanism lessons, the instructor should make the fullest use of diagrams, skeleton locks and the gun itself in order to make the soldier see for himself how the mechanism operates. Stereotyped verbal descriptions should be, and can be, avoided by the good instructor.

/LESSON 13 ....

LESSON 13

FIRING ACTION FIRST SHOT AND ACTION ON RECOIL

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condensor can and tube, liner and belt with drill cartridges, spare parts case, empty cartridge case, skeleton lock, wall diagram and a pointer.

PERIODS

One period.

PREPARATION

The gun will be mounted with the other stores to hand. The wall diagrams when required will be put up where they can be seen by the squad.

POINTS TO BE CONSIDERED DURING LESSON

Safty precautions must be done before the time.

INTRODUCTION TO LESSON

The soldier must know how the gun works before he can remmedy a stoppage.

AIM

To teach the soldier how the gun works.

B CONDUCT OF LESSON

FIRING ACTION, FIRST SHOT

1. Load the gun and raise the rear cover. Remove the trigger bar.

2. Tell the squad that they will now see how the first shot is fired. Tell them to watch the trigger bar lever and then raise the safety catch and press the thumb-piece. Point out that the pawl near the bottom of the firing lever pushes forward the bottom of the trigger bar lever. As this is pivoted near the centre, the top moves to the rear.

3. Place the trigger bar over the trigger bar lever and trigger. Tell the squad to watch the trigger bar and again press the thumb-piece.

/point .....

Point out that as the top of the trigger bar lever moves to the rear it engages in the projection on the trigger bar and draws it backwards. The front wall of the slot in the trigger bar pulls the tail of the trigger to the rear.

4. Hold up the skeleton lock so that the squad can see it and, controlling the firing of it, explain that as the trigger bar pulls the tail of the trigger to the rear, the nose of the trigger is released from the bent of the tumbler. This allows the long arm of the lock spring to propel the firing pin forward on to the cap of the cartridge, thus firing the round.

5. Confirm the action in the lock using the wall diagrams.

6. Questions the squad on firing action, first shot.

ACTION AND RECOIL

7. Place an empty cartridge case between the upper and lower projections of the gib. Half load and press the thumb-piece. Remove the fusee box and spring. Remove the outer casing muzzle attachment and the right slide. Raise the rear cover.

8. Tell the squad to watch the recoiling portions. The instructor should now move to the front of the gun and, stating that he is representing the forces which work the gun, push the muzzle cup back. The squad should then see the recoiling portions move back about one inch. Point out that this backward movement would extend the fusee spring.

9. State that this backward movement is caused partly by recoil and partly by the effect of the muzzle attachment. Explain how the gases, which escape through the muzzle after the exit of the bullet, strike violently against the front cone and rebound on to the muzzle cup. This assists in driving the recoiling portions backwards. The gases then escape through the vents in the outer casing.

SUM UP

Sum up the main points.

CONCLUSION

Questions from and to the squad,

/LESSON 14.....

LESSON 14

FIRST ACTION IN THE FEEDBLOCK

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, candenser can and tube, liner with belt and drill cartridges, spare parts case, an empty cartridge case, wall diagram.

PERIODS

One period.

PREPARATION

The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

POINTS TO BE CONSIDERED DURING LESSON

Safety precautions.

INTRODUCTION TO THE LESSON

Revise by questions and answer "Action on recoil".

AIM

State that this lesson deals with the effect of the backward movement of the recoiling portions on the feedblock.

B CONDUCT OF LESSON

FIRST ACTION IN THE FEEDBLOCK

1. The instructor should set up the gun by placing an empty case between the upper and lower projections of the gib. He should half load and press the thumb-piece, raise the front cover and remove theouter casing muzzle attachment and fusee box and spring.

2. Point out the recess in the prolongation of the left side plate and tell the squad to watch it, whilst the instructor (representing recoil) pushes back the muzzle cup. The recess will be seen to move to the rear.

3. Show the squad that the recess in the prolongation of the left side plate carries back with it the stud on the bottom lever of the feedblock. Explain and demonstrate how the bottom lever acting on the top lever causes

/the .....

the slide to move to the right.

4. The instructor should now place a drill cartridge in front of the bottom pawls of the spare feedblock. By operating the lower lever, he can show the squad how, when the slide moves to the right, the top pawls ride over the round and engage behind it. The bottom pawls prevent the round from slipping out of the feedblock.

5. Confirm the action of the feedblock using wall diagrams.

6. Questions the squad.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

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LESSON 15

BACKWARD ROTATION OF THE CRANK AND SECOND ACTION IN THE FEEDBLOCK

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, liner with belt and drill cartridges, spare parts case, an empty cartridge case, wall diagram, pointer and a spare feedblock.

PERIODS

One period.

PREPARATION

The gun will be mounted with the other stores to hand. The wall diagrams will be put up, when required, where they can be seen by the squad.

INTRODUCTION TO THE LESSON

Revise first action in the feedblock.

AIM

Tell the squad that this lesson deals with the actions that take place in the recoiling portions during the backward movement, and with the effect this has on the feedblock.

B CONDUCT OF LESSON

BACKWARD ROTATION OF THE CRANK

1. Revise briefly "Action on Recoil" and set up the gun as follows :-

Place an empty case between the upper and lower projections of the gib. Half load and press the thumb-piece. Remove the fusee box and spring and the outer casing muzzle attachment. Raise the rear cover.

2. Tell the squad to watch the crank handle and slowly push back the muzzle cup. Point out that the backward movement of the recoiling portions causes the tail of the crank handle to roll on the roller, therby rotating the crank. The rotation of the crank draws back the lock, in

/the .....

the same way as the human knee when bent draws back the foot. The rotation of the crank also causes the fusee to rotate and wind in the fusee chain, thereby further extending the fusee spring.

3. Tell the squad that at this stage the force of recoil is expended, but the momentum of the lock, connecting rod, crank and crank handle causes the crank handle to continue rolling against the roller. Demonstrate by pressing the knob of the crank handle, and point out that this rolling of the crank handle assisted by the pull of the fusee spring forces the whole of the recoiling portions forward, with the exception of the lock. Show how the lock continues its backward movement for a short distance before it joins in the general forward movement.

4. Question the squad.

SECOND ACTION IN THE FEEDBLOCK

5. Revise, by question and answer, the "First action in the feedblock" and set up the gun as follows :-

Pull back the recoiling portions until the crank handle is vertical close the rear cover and raise the front cover.

6. Force the recoiling portions forward by pressing on the knob of the crank handle, causing it to roll on the roller and tell the squad to watch the recess in the moves forward, carrying with it the stud on the bottom lever. The bottom lever acting on the top lever will move the slide back to the left.

7. Hold up the spare feedblock with a drill cartridge in front of the bottom pawls and the slide out to the right. Operate the lower lever by hand and show how the top pawls on the slide bring the cartridge in the belt to a position against the cartridge and bullet stops, ready to be gripped by the extractor. Explain how the belt as it moves to the left slides over the bottom pawls. These pawls are depressed as the cartridges pass over them but raise again behind the fourth cartridge and prevent the belt from slipping back after the third round has been withdrawn by the extractor.

8. Confirm this with the aid of the diagrams.

9. Question the squad on the "Second action in the feedblock".

SUM UP

Sum up the mainpoints.

CONCLUSION

Questions to and from the squad.

/LESSON 16 .....

LESSON 16

BACKWARD MOVEMENT AND COCKING OF THE LOCK

A INSTRUCTOR'S NOTES

STORES

Gun, tripod condenser can and tube, liner with belt and drill cartridges, spare parts case, spare lock, skeleton lock, and wall diagram.

PERIODS

One period.

PREPARATION

The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

INTRODUCTION TO LESSON

1. Revise by question and answer "Action on Recoil" and set up the gun as follows :-

Place an empty case between the upper and lower projections of the gib. Half load and press the thumb-piece. Remove the fusee box and spring. Raise the rear cover.

2. Draw the lock slowly backwards by rolling the crank handle on the roller and point out the movement of the lock to the squad. They will see that as the lock moves backwards, the extractor withdraws a live round from the feedblock an the empty case from the chamber. The horns of the extractor arrives at the end of the cams, it would be forced down by the ramps on the rear cover and thus bring the live round into line with the chamber. State that the empty case would probably fall off at this stage.

3. Hold up the spare lock with a drill cartridge on the extractor and let the squad see that the cartridge is prevented from falling off the face of the extractor by the lower projection of the gib.

AIM

This lesson deals with the cocking of the lock.

/B CONDUCT .....

B CONDUCT OF LESSON

COCKING THE LOCK

4. Set up the gun again and state that the squad will now see what is happening inside the lock.

5. Draw the lock slowly backwards again by rolling the crank handle on the roller. Point out that the rotation of the crank handle causes the base of the connecting rod to rise and force the side levers head upwards.

6. Hold up the skeleton lock, and, lifting the side levers head by hand, show how the tumbler is rotated on its axis pin and the firing pin thus drawn to the rear. Show that the long arm of the lock spring bears on the firing pin and the short arm on the nose of the trigger. Consequently the withdrawal of the firing pin compresses the lock spring.

Point out that as the tumbler continues its rotation, the short arm of the lock spring forces the nose of the trigger over the bent of the tumbler. But the tumbler carries the firing pin still further to the rear until the sear, forced by the sear spring has its bent engaged in the bent of the firing pin. The firing pin is thus prevented from flying forward by the bent of the sear being engaged in the bent of the firing pin."

7. Confirm the mechanism of cocking the lock with the aid of the wall diagrams.

8. Question the squad.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 17 .....

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LESSON 17

FORWARD MOVEMENT OF THE LOCK

A INSTRUCTOR'S NOTES

STORES

Gun, tripod condenser can and tube, liner with belt and drill cartridges, spare parts case, spare lock and wall diagrams.

PERIODS

One period.

PREPARATION

The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

INTRODUCTION TO LESSON

Revise by question and answer the backward movement and cocking of the lock and set up the gun as follows :-

Half load. Remove the fusee box and spring. Pull the crankhandle on to the roller and pull the belt to the left. Raise the rear cover.

AIM

This lesson deals with the preparation for the next shot.

B CONDUCT OF LESSON

FORWARD MOVEMENT OF THE LOCK

1. Explain that when the force of the explosion is expended, the fusee spring takes command and by unwinding the fusee chain from the fusee rotates the crank.

2. Push the crank handle slowly on to the check lever and show how the rotation of the crank forces the connecting rod forwards and downwards. thereby causing the lock to continue its forward movement. Let the squad see how, as the lock travels forward, the extractor forces the live round into the chamber and then is moved upwards by the side levers acting on the extractor levers. Demonstrate the action of the side levers with the spare lock.

/3. Using the .....

3. Using the spare lock, point out that as the extractor rises, the lower projection of the gib slides over the base of the live round which has been moved into position in the feedblock. Show that the firing pin hole is thus brought opposite the cap of the live round in the chamber.

SEATING FOR EJECTION

4. Remove the elevating joint pin and up-end the gun. Pull the crank handle on to the roller and place an empty case on the extractor opposite the firing pin hole.

5. Push the crank handle on to the check lever and show the squad how the empty case, if it has not fallen off before, will be forced off by the seating for ejection, as the extractor rises.

6. Lower the gun and replace the elevating joint pin.

SIDE PLATE SPRINGS

7. Point out the grooves in the sides of the extractor and explain that as soon as the extractor reaches its highest position, the side plate springs engage in the grooves. This prevents the extractor from falling if there were no cartridges on its face as it begins its backward movement. If it did fall, the horns would foul the cams in the breech casing.

LOCKING OF THE BREECH

8. Repeat the forward movement of the lock and explain that the final movement of the connecting rod and side levers head causes the lock to be forced slightly further forward and closes the breech. With the spare lock, point out that during the final movement the steps on the side levers travel over the bents of the extractor levers and the base of the connecting rod goes below the horizontal. This locks the breech during the explosion of the charge.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 18 .....

LESSON 18

SUBSEQUENT SHOTS AND END OF BURSTS

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, liner with belt and drill cartridges, spare parts case, skeleton lock and wall diagrams.

PERIODS

One period.

PREPARATION

The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

INTRODUCTION TO LESSON

6. Tell the squad that they know the actions that take place from the moment when the thumb-piece is pressed until the second round is fed into to the chamber. In this lesson they will see how the automatic fire of the gun is achieved and also how the gun stops when pressure is released from the thumb-piece.

AIM

This lesson deals with the automatic fire of the gun.

B CONDUCT OF LESSON

FIRING ACTION, SUBSEQUENT SHOTS

1. Revise "Firing Action, First Shot" and set the gun by half loading raising the rear cover, removing the trigger bar and placing it over the trigger bar lever and trigger.

2. Draw back the lock, pull the belt to the left, and, controlling the trigger bar, allow the lock to go slowly forward. Explain that the firer ,by maintaining pressure on the thumb-piece, holds back the trigger bar. Therefore each time the lock goes forward, the front end of the slot holds backthe tail of the trigger before the lock is quite home.

3. With the skeleton lock cocked, push back the tail of the trigger

/and .....

and point out that by this means the nose of the trigger is prevented from engaging in the bent of the tumbler.

Explain and demonstrate that when the lock is home, the side levers head depresses the sear, thus allowing the long arm of the lock spring to drive the firing pin on to the cap and fire the charge. State that the depression of the sear is so timed that the firing pin is not released until the lock is in the firing position.

4. Question the squad.

END OF BURSTS

5. Set up the gun by fully loading, and place the trigger bar over the trigger bar lever and trigger.

6. Release pressure on the thumb-piece and show the squad that the trigger bar resumes its normal position.

7. Using the skeleton lock, point out that this allows the short arm of the lock spring to force the nose of the trigger against the tumbler.

Thus, as the lock comes forward and the sear is depressed, the nose of the trigger engages in the bent of the tumbler and the firing pin is held back.

8. Question the squad.

SUM UP

Sum up the whole mechanism of the gun.

CONCLUSION

Questions to and from the squad.

/CHAPTER 4.....

CHAPTER 4

ELEMENTARY GUN DRILLS

INTRODUCTORY NOTES

AIM

1. To teach the soldier his duties in handling the weapon as a member of a gun team.

INSTRUCTORS NOTES

2. During gun drill, the gun will be mounted in the sitting position, but the instructor must emphasize that on active service and during the later stages of training, the tripod will always be adjusted to suit the ground and cover available.

3. All orders are shown in thick type throughout this part of the pamphlet.

4. When the instructor wishes to explain, demonstrate or criticize, he will first order "Rest" to allow the gun number to relax. On this order, the No 1 will knock down the tangent sight. Before the drill is resumed he will ensure that the gun numbers adopt the correct position and are alert and ready for any order. This will be done by ordering "Position" when, if the sights had previously been knocked down the No1 will raise them.

5. The instructor must insist on a high standard of drill through out and see that the gun numbers remain still and in their correct position on the completion of any movement.

6. Although all lessons of gun drill are written for coming into action from the vehicle if vehicles are not available it will be possible to bring the guns into action from the ground. The stores should be laid out on the ground as follows :-

The tripod on the left, with the legs to the rear, and the dial sight close to it.

The gun, with the muzzle forward, condenser tube attached and spare parts case placed two paces to the right of the tripod.

Two liners, the condenser can and the aiming post two paces to the right of the gun, with the condenser can on the right.

The position of the gun numbers and the words of command will be given as for the carrier.

/On .....

On the command "Mount" the gun numbers will kneel by their respective stores. Nos 1 and 2 will put on the dial sight and spare parts case, with the strap over the right shoulder and the case hanging on the left side.

7. Whenever possible in gun drill as many guns as are available should be used to give maximum squad practice.

SAFETY PRECAUTIONS

8. On all occasions when the gun and drill cartridges are used for instructional purposes, the instructor will carry out the following safety precautions.

a. Inspect all locks to ensure that the striker does not protrude through the firing pin hole.

b. Inspect all ammunition to ensure that all cartridges are drill.

/LESSON 19 .....

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LESSON 19

PRELIMINARIES TO GUN DRILL

A INSTRUCTOR'S NOTES

STORES

One gun carrier complete with drill stores. Gun, tripod, condenser tube and can, dial sight in case, spare parts case, aiming post, three liners complete with belts and drill cartridges.

PERIODS

One period.

INTRODUCTION TO LESSON

AIM

1. To teach the soldier preliminaries to gun drills and the technique of mounting and dismounting the tripod.

B CONDUCT OF LESSON

"FALL IN"

1. On the command "Fall in" the detachments will adopt the following positions :-

The driver, of No 1 detachment two paces infront of the RIGHT mudgaurd . The remainder of the detachment from RIGHT to LEFT, with the No 3 three paces infront of and two paces to the RIGHT of the driver.

No 2 detachment. From RIGHT to LEFT, in line with No 1 detachment, the No 1 two paces to the LEFT of the LEFT front mudgaurd. The section 2 IC three paces infront and centrally between the two detachments.

2. Practice the squad in "Fall in".

"CHANGE ROUND"

3. Explain that if at any time the instructor wishes to change the Nos he will order "Change round". On that command the No 1 becomes the driver, the driver becomes No 3, the No 3 becomes the No 2 and the No 2 becomes the No 1. On completion of the movement the detachmentwill renumber again taking the time from No 1.

/4. Practice.....

4. Practice the squad in "Fall in" and "Change Round".

5. On the command "Mount" the Nos 1 will acknowledge, both the detachments including the 21C will turn to their LEFT, the drivers will turn to his RIGHT.

The detachments will double to the rear of the vehicle, climb in and take up their positions; from front to rear, the Nos 1 will raise and lock the tailboard and mount. The driver and 21C double to their own side of the cab and mount.

6. Order "Mount".

7. Tell the squad that on the order "Dismount" the Nos 1 will repeat the order, all numbers will dismount and stand at ease in their respective positions in front of the vehicle.

8. Order "Dismount".

9, Practise the squad in "Mount" and "Dismount".

10. Questions from the squad.

MOUNTING THE TRIPOD

PREPARATION

11. The instructor will remove the tripod from the vehicle and place it on the ground in front of the vehicle and move the squad in a semi-circle around the tripod.

APPROACH

12. Tell the squad that you are now going to teach them the technique of mounting and dismounting the tripod.

MOUNTING THE TRIPOD

13. Demonstrate slowly and explain that the no 1 stands astride the tripod, loosens the jamming handles simultaneously and grasps the crosshead as far forward as possible with both hands, the thumbs being down the front of the crosshead. He will then swing the tripod upwards and forward to open the two front legs, and with the three legs resting on the ground, he will raise the socket until it is upright. To assist this, and to ensure that the mounting is upright, the No 1 should assume a half sitting position with the elbows supported on the inside of the thighs, and keeping the socket steady with his left hand, he will tighten both jamming handles with his right hand. A final pressure will now be exerted on the jamming handles, and the No 1 will sit down behind the tripod

/and .....



Mounting the tripod

and remove the crosshead and elevating joint pins with the left and right hands respectively, and hold them.

DISMOUNTING THE TRIPOD

14. Demonstrate slowly and explain that the No 1 will replace the two pins and turn the handles down to prevent them falling out, jump to his feet and stand astride the tripod. He will loosen both jamming hands both jamming handles simultaneously, allowing the tripod to collapse on the ground.

Standing on the left of the tripod he will grasp the crosshead with both hands, and with a sharp forward and upward movement allow the two front legs to fold under, at the same time taking a pace forward and placing the tripod on the ground. He will then sink down on to his right knee and tighten both jamming handles.

MOUNTING THE GUN

MOUNTING THE GUN

15. Demonstrate the method by which No 2 will carry the gun forward to the tripod. He will grasp the gun with his left hand on the right traversing handle and his right arm over the barrel casing controlling the condenser tube and pick up the gun. Tell the No 2 to pick up the gun as shown and double forward to the right side of the tripod with the traversing handles to the front, arriving at about the time that the No 1 is removing the pins. Explain with the No2 practising that on arrival he will swing to his left so that the traversing handles are at the rear, sink down on to his left knee, place the gun on the tripod supporting the barrel casing on his right thigh, and with his right hand will insert the crosshead joint pin, which he will take from the No1, finally turning the handle down. He will retain his hold with his left hand on the right traversing handle until the pin is home. No1will assist by gripping the left traversing handle with his left hand, and when No 2 has inserted the crosshead joint pin, he will insert the elevating joint pin. No 2 will then lie down on the right of the gun facing towards it, keeping as close as possible to the No 1, his head in line with, but below the level of the feedblock.

DISMOUNTING THE GUN

16. The No 2 will jump to his feet and after No 1 has removed the pins, lift the gun off the tripod and grasp the free end of the condenser tube to prevent it trailing on the ground make about turn. He will then double to the vehicle and mount.

DUTIES OF NO 3

/WHEN .....



Mounting the gun.

WHEN MOUNTING GUN

17. Order the Nos 1 and 2 to rest and look on. Explain with the No 3 practising that the No 3 will carry out the following duties on receipt of the command "Action". He will dismount from the vehicle remove the condenser can, aiming post and two liners from the vehicle. He will double forward to a point in rear of the gun position and will rip open and press down the lids of the liners, and will unscrew, but not completely so, the cap of the condenser can. He will double forward to the right side of the gun, with the liners in his left hand and the condense can in his right, arriving just as the No 2 lies down. He will place the condenser can near the tripod, and the ammunition liners within easy reach of the No 2. He will remove the cap of the condenser can, double back to a suitable position in rear and lie down, keeping the aiming post with him.

WHEN DISMOUNTING GUN

18. The No 3 will double forward to the gun, and remove the condenser tube from the condenser can, seize the liners in his left hand and the condenser can in his right. He will then double back a few paces to the rear, place the stores on the ground, screw up the cap on the condenser can, replace them on the carrier, mount and take up his original position, reconditioning the stores if necessary.

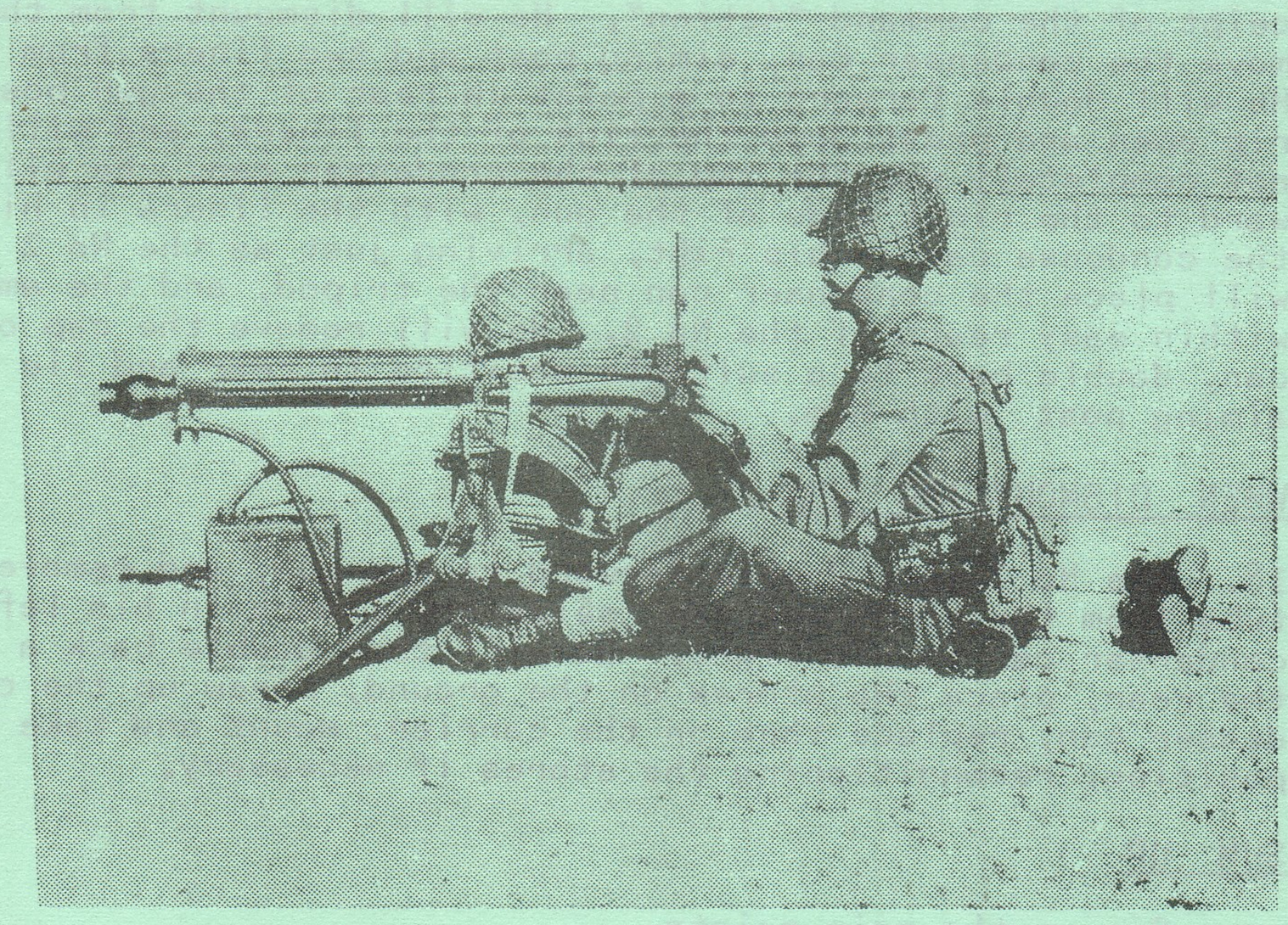
SUM UP

Sum up the main points.

CONCLUSION

Practice.

/LESSON 20.....



Sitting position

LESSON 20

THE SIGHTS AIMING AND LOADING

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, liner with belt and drill cartridges, landscape or natural targets.

PERIODS

One period.

PREPARATION

Gun mounted with the landscape target set up in front of the gun.

INTRODUCTION TO LESSON

Detail of No 2 and instructor as No 1. Order "Take Post".

AIM

1. To teach the soldier how to load and unload the gun correctly.

2. To teach the soldier to adjust the tangent sight to the range ordered and to lay a correct aim.

3. To teach the use of the battle sight.

B CONDUCT OF LESSON

LOADING THE GUN

1. Explain and demonstrate that on the order "Load" the No 2 will grasp the end of the belt with the right hand at the point where the tag joins the fabric, and push the tag through the feedblock as far as possible The No 2 must ensure that the belt is not twisted on entering the feedblock.

2. Exercise No 2.

3. Explain and demonstrate that on the order "Load" the no 1 will pull the crank-handle on to the roller with the right hand and advance the left hand to the left of the feedblock, ready to grasp the belt. When the no 2 has passed the tag of the belt through the feedblock, the No 1 will grasp it and pull it through the feedblock as far as possible; he

/must .....

must pull the belt gently and straight when doing so. He will release the crank handle and then repeat the movements.

Emphasize that while pulling the crank handle on to the roller the belt will be held but not pulled. Stress the importance of pulling the belt gently and straight; any snatching of the belt or pulling to the rear will result in faulty loading.

UNLOADING THE GUN

4. Tell the squad that on the order "Unload" the No 2 will withdraw the belt from the feedblock when the No 1 has pressed the pawls. He will then replace the belt in the liner.

5. Explain and demonstrat that on the order "Unload" the no 1 will pull the crank handle on to the roller twice with the right hand, allowing it to fly forward each time, retaining corrct holding with the left hand on the traversing handle. He will then press the top pawls of the feedblock down with the first and second fongers of the right hand, and lift the bottom pawls with the thumb of the right hand, taking care to keep the entrance to the feedblock clear. When the last round is clear of the feedblock, and while the belt is being withdrawn he will press the thumb-piece.

6. State that if when the order "Unload" is given, the tangent sight is raised the No 1 will knock it down with his left hand.

PRACTICE

7. Practise the squad in loading and unloading the gun. Should any man show a tendency to slur the loading motions, the instructor should make him load by numbers, counting aloud whilst he is doing so.

THE SIGHTS AND AIMING

APPROACH

8. State the aim of the lesson (see paras 2 and 3).

Tell the squad that the sights are used in direct fire to obtain direction and elevation.

ADJUSTING THE TANGENT SIHGT

9. Point out that the sight is graduated form zero to 3,700 yards the correct line on the graduated plate for any particular range is the one under the figures indicating that range. The sight can be set to 50-yards intervals by eye.

/10. Demonstrate ....

10. Demonstrate adjusting the sights, then practise the squad, each man making several adjustments.

AIMING WITH THE TANGENT

11. State that the method of laying an aim with the machine gun is very similar to the rifle.

The rule of aiming is :-

Close either eye: look through the aperture at the target and select the point of aim. Look at the tip of the foresight and bring it up to the point of aim, keeping the point of aim in the centre of the aperture. The sights must be upright, which is ensured by the correct mounting of the tripod.

Note - The point of aim on a target when firing the machine gun, is the centre of the base, unless otherwise ordered by the Fire Controller.

LAYING A CORRECT AIM

12. The instructor will now lay a correct aim on the landscape target and explain and demonstrate that whilst laying an aim, direction is obtained by tapping the traversing handles and elevation by menas of the elevating handwheel. Whenever either tapping or elevating the gun, the disengaged hand must retain correct holding.

PRACTISE

13. Let each man in the squad view the correct aim and then, in turn, lay the gun himself. Should any faults be detected, the instructor must explain their effect, and see that they are remedied. If a man's aim is incorrect the instructor must convince him that it is so and persevere until he can lay a correct aim.

14. Further practice should then follow on natural targets.

NOTHING A POINT OF AIM

15. State that when allowing for wind it will often be necessary to note a point of aim to the left or right of a target. Lay an aim on a target, tap the gun of and ask the squad to describe where the gun is laid.

BATTLE SIGHT

16. Point out the battle sight and tell the squad that this sight is used in emergency at ranges up to 600 yards.

/Sum up .....

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

LESSON 21

ACTION AND CEASE FIRING

A INSTRUCTOR'S NOTES

STORES

One gun vehicle complete with stores.

PERIODS

One period.

PREPARATION

All stores loaded on vehicle.

POINTS TO BE CONSIDERED DURING LESSON

Do not get involved in section drill.

INTRODUCTION TO LESSON

Combinding lesson 19 and 20.

AIM

To teach the duties of the various members of the gun team in coming into action

B CONDUCT OF LESSON

"ACTION"

1. Detail a gun team, order "Fall in" and "Mount". Indicate with a gun flag a gun position a few yards in front of the vehicle and the direction in which the gun is to be mounted.

2. Order the Nos 2, and 3 to rest and look on, Tell the No 1 that he is to carry out the following actions as they are detailed. On the command "Action", the No 1 will repeat the order, dismount from the vehicle and sling the dial sight over this right shoulder, remove the tripod, double forward to the position indicated and mount the tripod as already taught.

3. Order "action".

/4. Order . .....

4. Order Nos 1 and 3 to rest and look on. Explain, with the practising the duties of the No 2 on the command "Action". He will then sling the spare parts case over hisright shoulder and dismount from the vehicle Double forward and mount gun as already taught.

5. Detail the additional duties of the No 1. He will level the gun by means of the elevating wheel, tap the gun so that the traversing clamp is reasonably tight, and take up the correct sitting position looking straight to his front.

6. Nos 1 and 2 rest and look on. No 3 act already taught.

7. Detail the additional duties of the No 1 and 2. Explain that the No 2 will place the liners in line with the feedblock, No 1 and 2 will load the gun, and No 2 will insert the condenser tube in the can making sure that the end of the tube is below the level of the water.

"CEASE FIRING"

8. Tell the squad that on the order "Cease firing" Nos 1 and 2 will unload the gun, and No 2 will push the liners right. No 3 will move forward and act as already taught and replace the stores in their original position.

9. No 2 will act as already taught and replace the stores in their original position.

10. No 1 will act as already taught, and replace his stores on the vehicle, mount and recondition them if necessary.

11. Order "Cease Firing".

TEAM PRACTICE

12. Excercise the squad in the duties of No 1, 2 and 3 in "Action" and "Cease Firing" as a team. When the gun is in action the instructor should discuss :-

a. The actions of the No 1, and 2 and 3 and their final positions.

b. Whether the tripod is mounted with reference to the direction indicated.

c. Whether the gun is level and the crosshead is over the rear leg.

d. Whether the socket is upright and over the spot indicates.

e. Whether the traversing clamp is too loose.

/f. Whether .....

f. Whether the elevating and crosshead joint pins are home and locked.

g. Whether the jamming handles are really tight.

h. Whether the ammunition liners are in line and close to the feedblock, the condenser can in position, the tube inserted and the gun correctly loaded.

MOUNT AND DISMOUNT GUN

13. State that if at any time the gun is not to be loaded, the order given will be "Mount Gun," and the actions of the gun team will be the same with the exception that the gun will not be loaded.

CORRECTING A LEANING MOUNTING

14. Detail a gun team and order "Dismounted Action". When the gun is in action adjust the mounting so that it is leaning.

15. Explain with Nos 1 and 2 practising, that to correct a leaning mounting, the No 1 will order the No 2 to push the gun according to which way the gun is leaning. The No 2 will grasp the feedblock and act as ordered, while the No 1 will adjust the appropriate tripod leg. State that a leaning mounting must be corrected automatically directly it is noticed.

16. Practise will be obtained in correcting leaning mounting during the normal practice of "Action" and "Cease Firing".

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

LESSON 22

CLEAR GUN STAND CLEAR

A INSTRUCTOR'S NOTES

STORES

One vehicle complete with stores.

PERIODS

One period.

PREPARATION

Stores loaded on vehicle.

INTRODUCTION TO LESSON

Detail a gun team and order "Fall in" "Mount" and "Mount Gun".

AIM

1. To teach certain drills required in connection with safety precautions and range work.

B CONDUCT OF LESSON

"CLEAR GUN"

1. Order the No to fall out, the instructor taking his place and demonstrate that on the order, "Clear Gun," the No 1 will pull the crank handle onto the roller, raise the rear cover, remove the lock from the lock guides and ease the crank handle forward on to the check lever, allowing the lock to rest on the hinge of the rear cover. He will then report "No ..... Gun Clear".

2. Demonstrate that on the order "Lock In cover Down" the No 1 will hold the lock with his left hand, pull back the crank handle onto the roller with his right hand and, easing the crank handle slightly forward smother the lock into the lock guides with his left hand. He will then close the rear cover, release the crank handle and press the thumbpiece.

3. Tell the squad that if the order "Load" is given when the gun is "Clear" the No 1 will place the lock back in the gun, close the rear cover and load.

4. Practise the squad in "Clear Gun", "Lock in Cover Down", and

/Load .....

"Load". Note : If the gun is loaded, "Clear Gun" will be preceded by "Unload."

"STAND CLEAR"

5. Explain that if the order "Stand Clear" is given the gun team will jump to its feet and stand at ease behind the gun - the No 3 in the rear. The dial sight box and spare parts case will be left on the gun position.

6. Tell the squad that if the order "Take Post" IS given when the gun is mounted, the gun team will adopt their original positions at the gun. The No 1 and 2 will sling the dial sight box and spare parts case over their shoulders and the No 1 will retest the clamp.

7. Practice the squad in "Take Post" and "Stand Clear".

SUM UP

Sum up the mainpoints.

CONCLUSION

Questions to and from squad.

/ADVANCED.....

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ADVANCED MACHINE GUN HANDLING

INTRODUCTORY NOTES

1. The following lessons provide an essential link between gun drill and field training. In that, the soldier is taught the drills he has already learnt to active service conditions, and to combine fieldcraft with speed and accuracy in handling the gun.

2. During these lessons all stores should be at service weights.

/LESSON 23 .....

LESSON 23

MANHANDLING OF LOADS - SHORT CARRY

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, dial sight, spare parts case and six liners.

PERIODS

One period.

PREPARATION

All stores will be at service weights, ie, barrel casing filled and liners weighted with stones etc.

INTRODUCTION TO LESSON

On occasions it may be necessary for the men to carry the gun and stores across exposed ground. Any comfortable method may be adopted, provided it does not damage stores and does not give away to the enemy the fact that a machine gun is coming into action. The methods given below are suggested.

AIM

To show the soldier various methods of carrying machine gun stores into action or crawling with them across exposed ground.

B CONDUCT OF LESSON

TRIPOD

1. Demonstrate that the tripod can be carried, walking or doubling, folded under the arm or in front of the body. It can also be carried on the back with the front leg over each shoulder. In this case, a liner can be slung over each front leg.

2. Demonstrate that when crawling, the tripod can be dragged a long by the rear leg. Care must be taken to damage the dial.

3. Practise the squad.

/The .....

THE GUN

4. Show the methods of carrying the gun when walking or doubling. It can be carried across the body with the barrel casing on the right forearm and with the left hand gripping the traversing handle and the free end of the condenser tube. Alternatively it can be carried at the short trail grasping the crosshead bracket with the right hand.

5. Demonstrate that when crawling, The No 2 can lie on his right side with the weight of his body supported by his right arm, and with the right knee bent. He can rest the breech casing on his right thigh and hold the barrel casing with his left arm. He can then crawl forward using his right elbow and left leg. The sliding shutter will be closed.

6. Practise the squad.

LINERS AND CONDENSER CAN

7. State that for short distances the maximum load is two liner and the condenser can or four liners. They may be carried with two liners in one hand and two liners or the condenser can in the other. A further method is to pass a strap or rope through the handles of the liners and sling them over the shoulder.

8. Demonstrate a convenient method of crawling. The handle of a liner may be hung over the toe of each boot. The No 3 can then crawl on his side pulling the condenser can with one hand and the liner with his feet. Another method is for the no 3 to push the liners and condenser can forward infront of himself.

9. Practise the squad.

TWO-MAN LOAD

10. State that if it is required to move a gun which has already been mounted to a new position a short distance away, it can be done by two men.

11. With the aid of one of the squad demonstrate that the store are lifted :-

By the No 1 with the right hand on the rear leg and his left hand holding two liners onthe left front leg.
By the No 2 with his left hand on the right front leg and the condenser can in his right hand. Before moving the gun in this fashion, it must be unloaded.

12. Again with the aid of one of the squad demonstrate that the gun when mounted can be dragged along by the No 1 and 2 crawling and

/crasping.....

grasping the front legs.

13. Practise the squad in two-man loads.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 24 .....

LESSON 24

MOUNTING THE GUN ON EXPOSED GROUND

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, dail sight, spare parts case and two liners.

PERIODS

One period.

PREPARATION

All stores will be at service weights.

INTRODUCTION TO LESSON

Give the aim of the lesson (See para 1 below). State that the mounting used during drills is not always the most suitable under active service conditions, owing to the necessity for concealment and the unevenness of the ground.

AIM

To teach the soldier how to mount the gun in the lowest position.

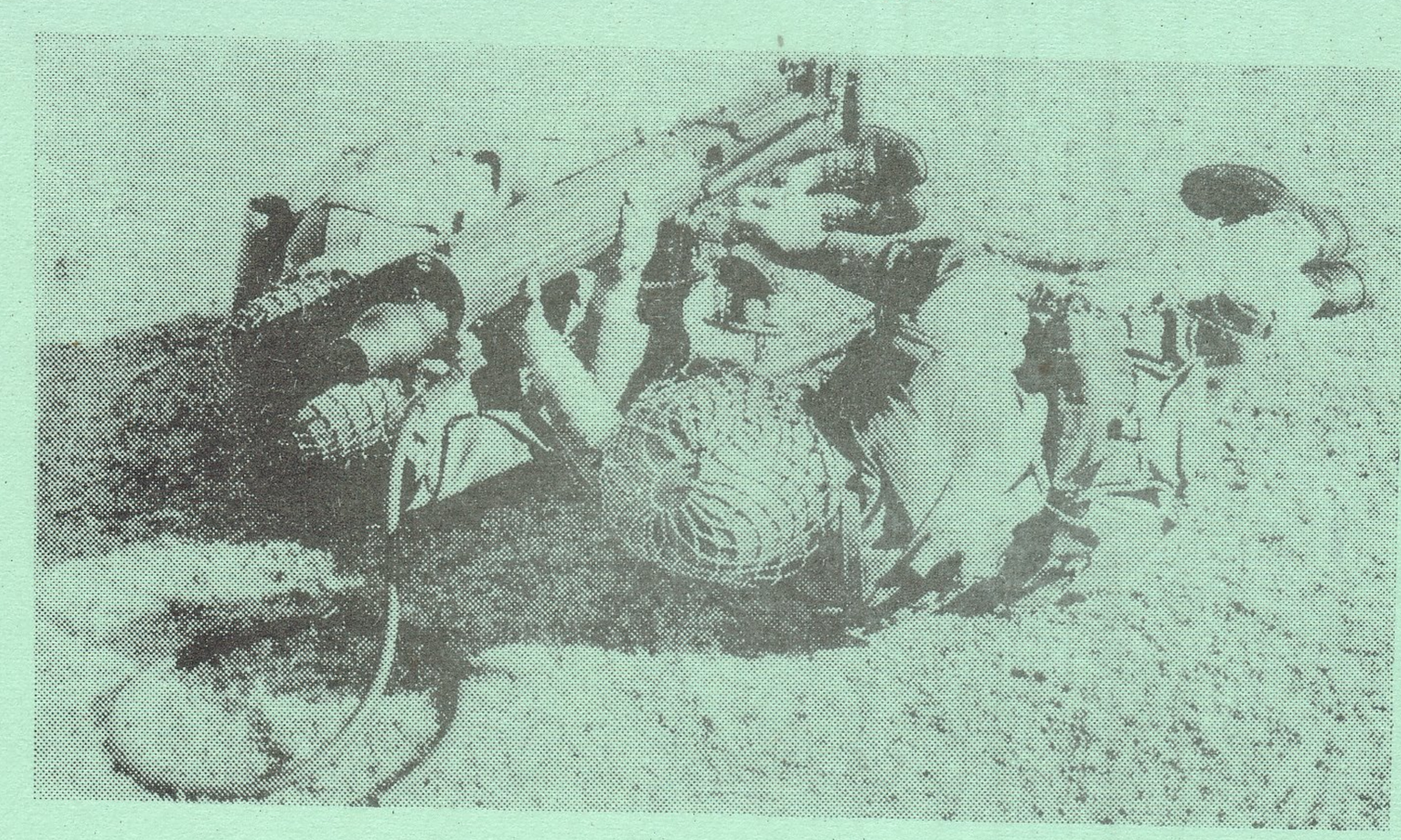
B CONDUCT OF LESSON

ADJUSTING THE TRIPOD

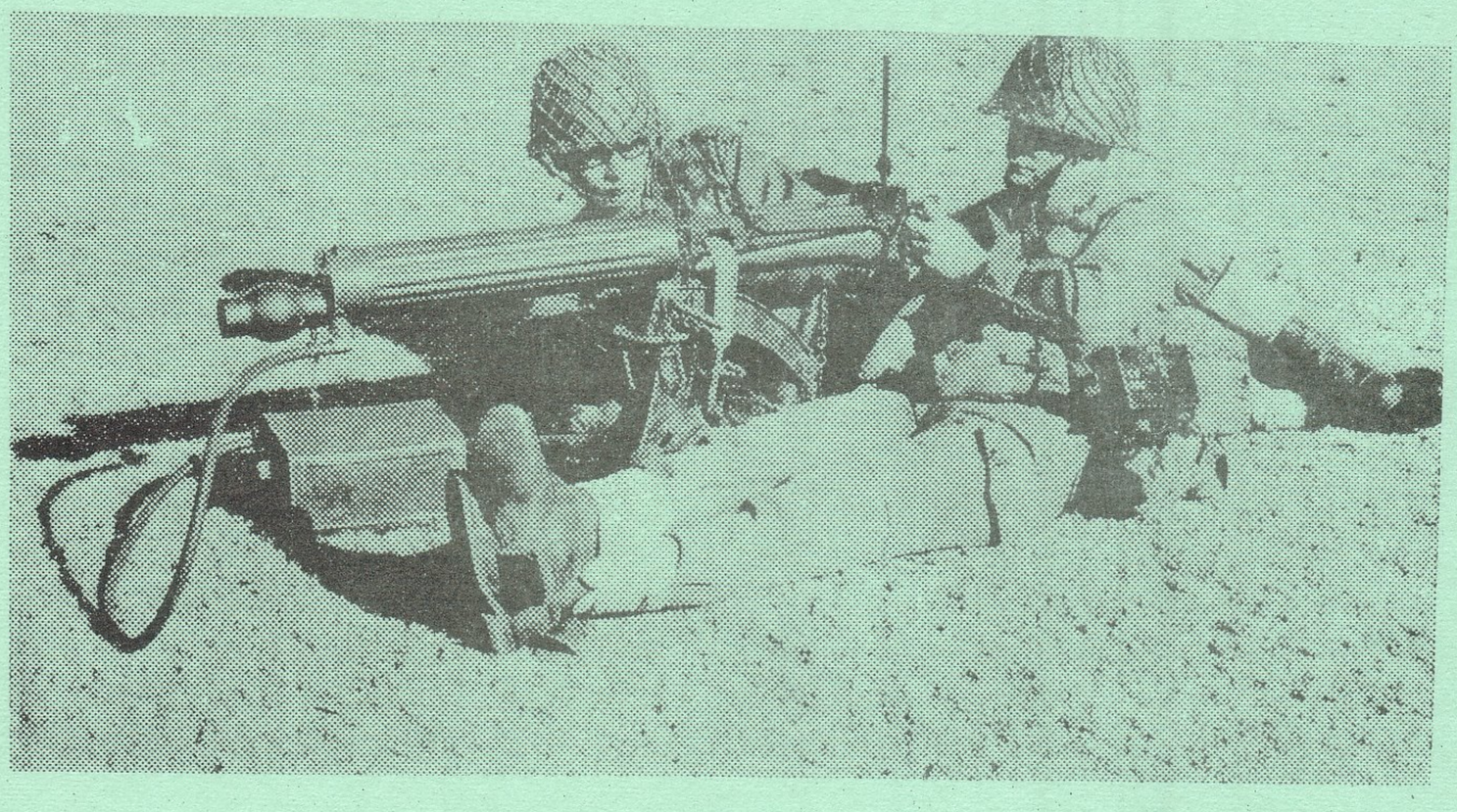
1. Demonstrate the method of adjusting the tripod to the lowest position. The no 1 keeping himself as low as possible, and lying on the left of the tripod, will loosen the front legs, and by leaning the tripod first to one side and then to the other side, will open the legs until all three are flat on the ground. Then holding the rear leg on the ground with the inside of his right knee, he will loosen the jamming of the rear leg and close the rear leg to the socket by pulling the socket to the rear. He will then move the socket one tooth on the rear leg clutch plates and tighten the rear jamming handle. Next the front legs are brought upwards and tothe rear and tightened over the rear leg.

2. Recondition the tripod and practise the squad in setting it for the lowest position.

/MOUNT.....



Mounting the gun in the lowest service position



Gun mounted in lowest service position





"MOUNT GUN," DUTIES OF THE NO 1

3. Explain with the No 1 practising, that when "Mount gun" is ordered he will adjust the tripod as in para 7 and will then crawl forward with the tripod on his right to the gun position, and lying on his left side he will release the front legs and raise the socket until it is upright and then clamp up the front legs. Finally he will remove the elevating and crosshead joint pins, and remain on his left side with his head to the front.

4. Order No 1 to rest and detail a No 2.

"MOUNT GUN," DUTIES OF NO 2

5. Explain with the No 2 practising, that he will close the sliding shutter and crawl forward with the gun, timing himself to arrive at the position when No 1 has mounted the tripod. He will then open the sliding shutter and, assisted by the No 1, place the gun on the tripod. The No 1 will insert the crosshead joint pin and the No 2 the elevating joint pin. The No 1 will then swing round, keeping as low as possible, and lie on his back with his legs to the front, right leg crossed over the left, and the No 2 will lie on his right side supporting the no 1 in the back with his right thigh and at the neck with his left knee.

"MOUNT GUN," DUTIES OF NO 3

6. State that the no 3 will act as in gun drill, except that he will crawl, and when behind the Nos 1 and 2, he will pass his kit to the No 2 to put into position, and will then crawl away to a position in rear.

7. Detail a No 3 to carry out his duties in "Mount Gun".

"DISMOUNT GUN"

8. Tell the squad that on the order "Dismount Gun" the gun caneither be dragged back on the tripod by the No 1 and 2 and dismounted under cover, to the gun can be removed by the No 2 and the tripod dragged back by the No 1. The No 3 will act as in gun drill except that he will crawl.

9. Order "Dismount gun."

10. Practise the squad in mounting and dismounting the gun in the lowest position.

SUM UP Sum up the main points.

CONCLUSION

Questions to and from the squad. /LESSON 25 .....

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LESSON 25

MOUNTING THE GUN ON UNEVEN GROUND

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, dial sight, spare parts case and two liners.

PERIODS

One period.

PREPARATION

An area of rough broken ground should be selected for this lesson.

INTRODUCTION TO LESSON

When making use of cover you will have to select the gun position to suit the cover, and will not always be level.

AIM

To teach the soldier how to mount the gun on sloping ground and behind various types of cover.

B CONDUCT OF LESSON

MOUNTING THE GUN ON UNEVEN GROUND

1. Mount the tripod correctly on a piece of uneven ground. Withdraw it and place it on a level ground, so that the squad can see how the legs could be adjusted before hand to suit the ground on which the gun is to be mounted.

2. Select another piece of ground and mount the tripod behind cover with the legs set to fit the ground. Then move the tripod into position and make final adjustments to correct the mounting.

3. Point out that when the gun is mounted the following conditions must be fulfilled :-

   a. The mounting must be as low as possible consistent with obtaining a view of the arc of fire and the target.

/b. The .....

b. The position of the rear leg is governed by the shape of the ground irrespective of the direction in which the gun has to fire. When mounted on a steep slope the rear leg should be pointing down the slope.

c. The socket must be mounted upright, and over the spot indicated.

d. The shoes only, and not the legs; must be bearing on the ground. A spade may be used to remove any obstruction.

e. The ground supporting each shoe; must be sufficiently firm to ensure that the shoes do not slip during firing.

f. No part of the tripod must interfere with the elevating wheel, in covering the arc of fire.

g. The gun numbers must adopt positions which conform with the ground and avoid unnecessary exposure.

4. Practise the squad in mounting the gun on uneven ground.

5. Explain and demonstrate and then practise the squad in mounting the gun in the following positions :-

a. On the side of a slope.

b. On the top of a narrow bank - with the aim of obtaining maximum command.

c. On the side of a bank with the barrel casing just clearing the top.

d. In a hedgerow.

e. In a shell hole or similar depression.

SUM UP

Sum up the main points.

CONCLUSION

Questions from and to the squad.

/LESSON 26 .....

LESSON 26

BRINGING THE GUN INTO ACTION MAKING USE OF COVER

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, dial sight, spare parts case and six liners, one gun flag.

PERIODS

Two periods.

PREPARATION

The instructor must decide on :-

a. An arc of fire and a target.

b. The gun position.

c. The ground from which the enemy can observe the gun position

d. The section rendezvous.

e. An area of broken groun is required for this lesson.

INTRODUCTION TO LESSON

1. Explain the normal method by which a section commander brings his guns into action :-

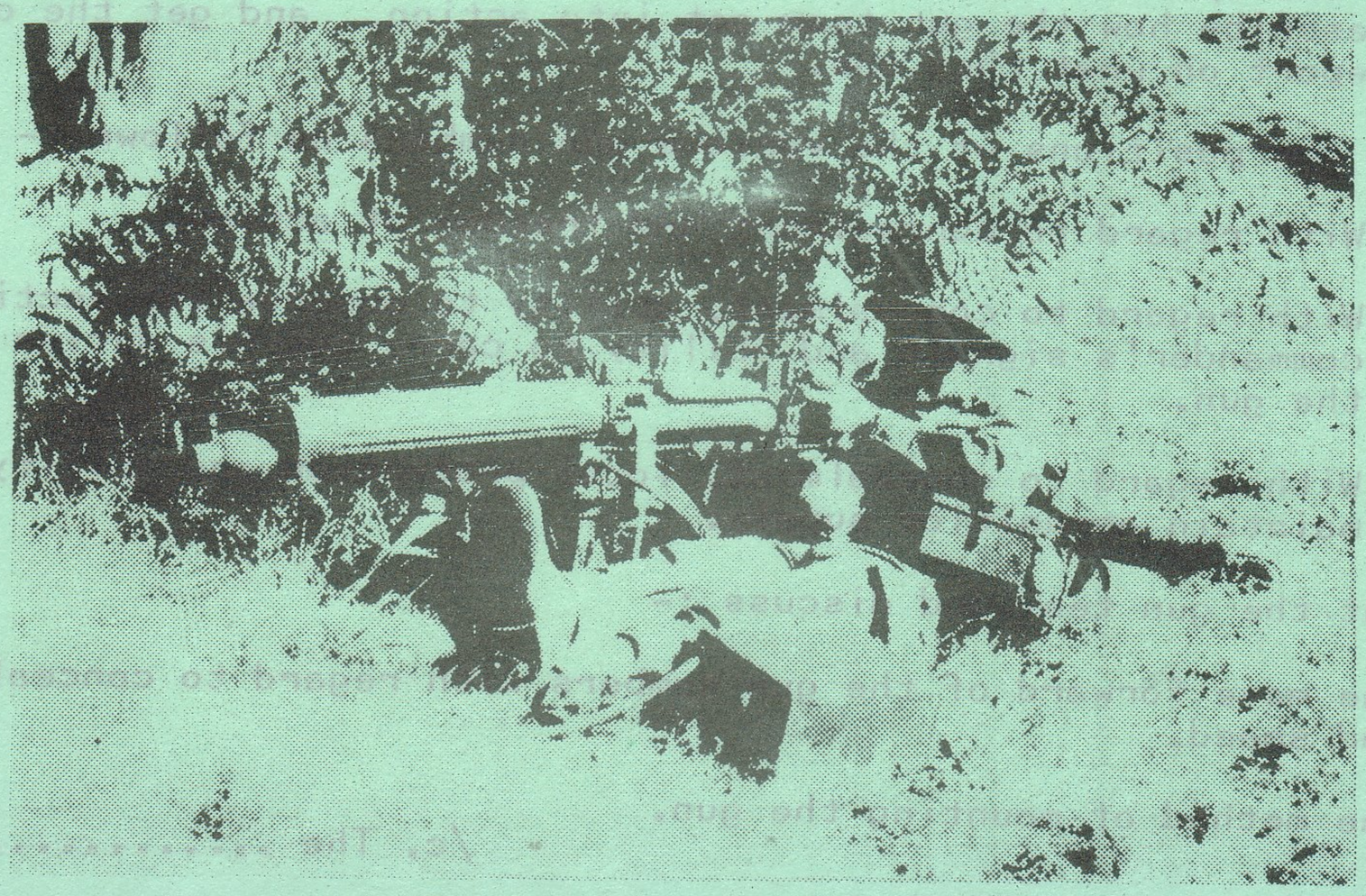
The section is led to the section RV be the senior No 1. There it is met by the section commander's drivers mechanic who orders "Dismounted action" and directs the Nos 1 up to the section commander. The section commander signals up both Nos 1 and indicates each gun position and the direction in which the guns will point. If the guns arrive in the section area at different times, he gives orders to each No 1 in turn. The section commander then controls the higher numbers into action. When the guns are mounted, he organizes the arc for fire and gives a fire order.

2. Stress that good team work within the section is essential. It is only when all members of the section work in complete harmony with the

/section .....



Gun mounted behind low cover



Firing through a hedgerow

section commander and with each other that a high degree of efficiency is obtained.

AIM

1. To teach the gun team to bring the gun into action with the minimum exposure to enemy observation and maximum cover from fire.

B CONDUCT OF LESSON

BRING THE GUN INTO ACTION

1. Paint a very simple tactical picture, for example :-

"The enemy are holding the high ground there. Our troops are held up there and there. The section has been ordered to support an attack by covering fire onto there."

2. Detail a gun team and send them into action RV. Send the remaining members of the squad to a position in the relative direction of the enemy to observe and report all movements seen. Despatch one of the squad back to the RV to order "Dismounted action" and send up the No 1.

3. The instructor will act as section commander and control the gun team getting into action. When they are in action, he will organize the arc of fire and engage the target.

4. Call in the spare members of the squad and let them inspect the gun position. Describe how the gun team got into action, and get the observers to report on what they saw.

5. Discuss the positions of the various gun numbers as follows :-

No 1.- With regard to concealment and freedom of action.

No 2 - With regard to concealment, ability to observe the section commander's signals and ability to carry out his duties at the gun.

No 3 - With regard to concealment, local protection and ability to maintain ammunition supply.

6. Fall out the gun team and discuss :-

a. The move forward of the gun numbers with regard to concealment and speed.

b. The method of mounting the gun.

/c. The .....

c. The suitability of the mounting for the gun position.

d. The ability of the gun to do its task.

e. The position of the stores at the gun.

f. How the gun position can be improved by digging and camouflage.

7. Practise the squad in coming into action on various types of ground.

8. Stress that six unused liners must always be maintained in the gun position.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

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LESSON 27

CONSISTANCY OF TAP

A INSTRUCTOR'S NOTES

STORES

Vehicle complete with stores and M.G. target.

PERIODS

Two periods.

PREPARATION

Stores loaded on the carrier.

INTRODUCTION TO LESSON

1. Detail a gun team, order "Fall In", "Mount" and "Action". When the gun is in action order the gun team to fall out.

2. State that the methods of engaging all types of machine gun targets depend on the fact that the No 1 can bring bursts of fire down 15 minutes of angle apart. It is therefore essential that every man can tap his gun consistently through 15 minutes.

AIM

To teach the soldier to develop a consistent tap so that the line of sight is displaced 15 minutes each time the gun is tapped.

B CONDUCT OF LESSON

CONSISTENCY OF TAP

1. Tell the squad that the first stage is to develop a consistent tap with both hands. Place the dial sight on the gun and then demonstrate a consistent tap with both hands.

2. Practise the squad until all of them can tap consistently. The instructor must not move onto the next stage until he is satified that they can do so.

3. The instructor should bring out the following points :-

   a. When tapping with either hand the gun must be held correctly with the other hand on the safety catch kept raised.

/b.....

b. The eyes must be directed to the front to observe fire.

ADJUSTING THE CLAMP

4. Place out the MG target 25 yards from the gun. State that the next stage is to adjust the clamp so that the tap consistently displaces the line of sight 15 minutes. Point out that the distance between the bulls on the target is equivalent to 15 minutes.

5. Demonstrate that the clamp is tightened as much as possible by the No 1 behind the gun. By trail and error, he adjusts his tap until he discovers the strength of tap required to displace the line of sight from one bull to the next. The strength of tap should be ascertained for each hand.

6. Practise the squad. When each man has found the strength of tap required, the instructor should impress on him that he must get the feel of tap and remember, it.

7. Tell the squad that the No 1 can test his clamp in the field by measuring off with hand angles two points which are one degree apart. By laying on one point and tapping four taps toward the other, he should reach the second point if the clamp is correctly adjusted.

8. Practise the squad.

TAPPING TEST

9. A method of testing the squad for correct tapping is given below :-

a. The instructor will give the No 1 :-

i. A suitable range.

ii. An indication to a bull in the horizontal row.

iii. The direction in which he is to tap.

iv. The order to "Lay".

b. The instructor will explain to the No 1 that, on the order "Fire" he will fire a burst, release the thumbpiece, tap the gun and fire again. He will continue this procedure "Stop" is ordered. The No 1 will be told that, for this lesson only, he will not check his aim on the order "Stop" nor relay between bursts.

/c. The .....

c. The instructor will order "Fire" and, after a suitable number of taps, "Stop". He will then check the aim and discuss the No 1's tapping.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 28 .....

LESSON 28

TRAVERSING AND SWINGING TRAVERSE

A INSTRUCTOR'S NOTES

STORES

Vehicle complete with stores.

PERIODS

One period.

PREPARATION

Stores loaded on vehicle.

INTRODUCTION TO LESSON

1. Detail a gun team, order "Fall in", "Mount" and "Action".
2. Revise Lesson 27.

AIM

1. To teach the soldier to combine consistent tapping with corrections for elevation.
2. To teach the soldier how to fire a swinging traverse.

B CONDUCT OF LESSON

TRAVERSING

1. State that No 1 will on occasion have to engage a tarbet that is oblique as opposed to horizontal.
2. Detail a No 1 and get him to lay on the centre bull of the oblique rows of bulls. Warn him that on the order "Fire", he will carry on exactly as taught in the last lesson, but that this time he will relay the gun on to the bull immediately above or below the point to which the tap has carried it, after each tap.
3. Practice the squad in tapping and re-laying for elevation. Get the squad to critisize the consistency of the tap of each No 1.

SWINGING TRAVERSE

/4. Explain .....

4. Explain that this method of traversing is only employed against targets at close ranges when the normal method of traversing is likely to be too slow.

5. Demonstrate that the clamp is loosened slightely. The gun is laid on one end of the target and, when the tumbpiece is pressed, it is swung slowly to the right or left. To do this with control, move the upper part of the body rather than by moving the forearms.

6. The technique of firing on swinging traverse cannot be well attained without using live ammunition as the recoil helps moving the gun. The squad should therefore be practised in firing a swinging traverse on the range when the opporunity arises.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 29 .....

LESSON 29

LAYING AND FIRING

A INSTRUCTOR'S NOTES

STORES

Vehicle complete with stores and landscape targets.

PERIODS

Two periods.

PREPARATION

1. Stores should be loaded on the vehicle and if a landscape target is used, it should be erected in a suitable position just in front of the gun position.

POINTS TO BE CONSIDERED DURING LESSON

2. The targets selected by the instructor must be simple, as the aim is to teach accurate handling and not recognition of targets.

INTRODUCTION TO LESSON

1. Detail a gun team and order "Fall in", "Mount" and "Action". When the gun is in action order the gun team to fall out.

2. Point out a few simple targets to be used during the lesson.

3. State that when the section commander orders the range to the guns, he will use the following terminology:-

700	-	Seven hundred.
1,000	-	One thousand.
1,050	-	One zero fifty.
1,400	-	One four hundred.
1,550	-	One five fifty.
2,000	-	Two thousand.
2,300	-	Two three hundred.
2,350	-	Two three fifty.

AIM

1. To teach the soldier how to lay and fire the gun.

2. To teach the soldier how to apply controlled corrections in direct fire.

B CONDUCT OF LESSON

ADJUSTING THE SIGHT AND LAYING THE GUN

1. The instructor will take post as No 1, one of the squad acting as No 2, and will demonstrate that on the range being ordered the No 1 will raise the tangent sight with the left hand and set the slide. When the indication followed by the command "Lay" is given, he will tap the gun until the correct direction is obtained and elevate or depress it until the aim is correct. Confirm that when tapping the gun or turning the handwheel, the No 1 wil maintain control of the gun by keeping the disengaged hand on the traversing handle.

2. Tell the squad that when the No 1 has a correct aim he will shout "On" and raise the safety catch. The No 2 will then raise his left hand in line with the No 1's shoulder as a signal to the fire controller.

3. State that if the No 1 fails at any time to understand or hear an order he will call "Again".

4. Practise the squad.

USE OF THE CLAMP

5. The instructor should take post as No 1 with one of the squad acting as the No 2. Explain to the No 2 that on the order "Clamp Two", he will loosen the clamp and on the order "Tighten" he will tighten it. Demonstrate that if a large change of direction is necessary, the No 1 will order "Clamp Two" and when the clamp is tight test it and lay on the target.

6. Practise the squad in large changes of direction.

"FIRE" AND "GO ON"

7. Tell the squad that on the order "Fire" or "Go on" the No 2 will lower his left hand and repeat the order. The No 1 will press the thumbpiece home, keeping his eye on the target to observe the fire effect. The No 1 will press and release the thumbpiece as taught in Lesson 2 checking his aim from time to time.

"STOP"

8. State that on the order "Stop" the No 2 will repeat it to the No 1 who will release pressure on the thumbpiece and safety catch. The No 1 will check his aim and relay the gun if necessary.

9. Practise the squad in "Fire," "Stop" and "Go on". The instructor

/should .....

should occasionally knock the gun or turn the wheel while No 1 is firing to practice the No 1 in relaying when "Stop" is ordered.

10. State that during firing on the order "Stop, Up (or Down) - Hundred (or fifty) "Go On", the No 1 will adjust his sights accordingly, relay and continue firing.

If the correction is not followed by the order "Go On" the No 1 will report "On" and await the order to fire.

11. Practise the squad in controlled corrections for elevation.

12. Explain that during firing a controlled correction for direction may be given, eg:-

"Stop - All LEFT one tap - go on."
"Stop - No 1 gun RIGHT two taps - go on".
"Stop - All LEFT one degree - go on".

Say that on receipt of the order the Nos 1 will apply the correction either by tapping or, in the case of degrees, by measurement of hand angles and tapping. They will note their new points of aim and continue firing. If the correction is not followed by the order "Go on", the No 1 will report "On" and await the order to fire.

13. Practise the squad in controlled corrections for direction.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.





/LESSON 30 .....

LESSON 30

ACTION AND CEASE FIRING (SECTION DRILL)

A INSTRUCTOR'S NOTES

STORES

Section drill stores, ie, one vehicle complete with guns, tripods, condenser cans and tubes, dial sights spare parts cases, six liners per gun, spare parts box, aiming post. Belts with drill cartridges, and two gun flags.

PERIODS

Two periods.

PREPARATION

The vehicle will be drawn up. Gun stores should be loaded on the vehicle, and the gun flags planted about 15 yards apart and 15 yards in front of the vehicle.

INTRODUCTION TO LESSON

AIM

1. To teach the personnel of the section to come into action and cease firing.

2. To teach the soldier the machine gun field signals.

B CONDUCT OF LESSON

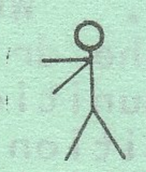
FIELD SIGNALS

1. Demonstrate the following field signals to the squad :-

a.	Senior NCO	Right arm at angle of 45 degrees from the side. 
b.	All NCOs to report .	(a) above repeated several times.
c.	More ammunition required	Right arm extended horizontally. 

/d. Vehicle .....

d. Vehicle to come forward ..... Right arm at angle of 45 degrees from the side and left arm extended horizontally to the right of the body.



e. Water required ..... Right arm at angle of 45 degrees above the horizontal and left arm extended horizontally to the left of the body.



f. Action ..... Both arms fully extended raised from the side to a position level with the shoulders and lowered again - repeated several times rapidly.



g. Cease firing ..... Arm swung in circular motion in front of the body.



h. Prepare to fire .... Hand raised above the shoulder.



j. Fire ..... Hand cut away to side.



k. Stop ..... Arm waved horizontally across the body.



2. Practise the squad in recognizing the signals.

ACTION

3. Tell the squad that the position of the vehicle represents the section RV, where the section will be met by the section commander's driver who will order "Action" and direct the Nos 1 up to the section commander, represented by the instructor.

4. Detail two gun teams and driver and a section commander's driver, order "Fall in" and "Mount" The section commander's driver will fall in front of the instructor, who should stand midway between the gun positions.

5. Explain that on the order "Action", the gun teams will act as in Lesson 21.

6. Tell the section commander's driver to order "Action". As the Nos 1 arrive on the position, the section commander should indicate the gun positions and the direction in which the guns are to point. /7 When ....

7. When the guns are in action with two liners each as in Lesson 21, that the drivers of the gun vehicle will remove all necessary stores and ammunition from the carrier and double forward with them to convenient position for the Nos 3. Six liners per gun will always be removed from the vehicle unless otherwise ordered. When the driver have brought up the remainder of the ammunition, the Nos 3 will take forward two more liners to the gun position. In addition the No 3 of the odd sub-sections (no 1, No 3 or No 5 gun) will carry forward the spare parts box to his position The No 3 will then take up positions in the rear and to the outer flanks of the positions, keeping two liners with them, The No 3 of the odd sub-sections also having the aiming post.

8. Order the drivers and Nos 3 to carry on.

9. State that the section commander's driver should now lead the vehicles back to the vehicle position, where they would camouflage them and then take up a position to watch for signals from the section area.

This will not be necessary in section drill.

"CEASE FIRING"

10. Tell the squad that when the section commander receives the order to cease firing, he will signal for the vehicle to come forward and then order "Cease firing".

11. Explain that all numbers willact as in lesson 21. In addition the respective Nos 3 will replace the spare parts box and assist the drivers in reloading any unused ammunition.

The drivers will bring forward their vehicles, double to the gun position and bring back any ammunition left by the No 3.

12. Order "Cease firing"

PRACTICE

13. Practise the squad in "Action" and "Cease firing". If there are any surplus members of the squad, they should be detailed to watch and be prepared to criticize each practice.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/CHAPTER 5 .....

CHAPTER 5

STOPPAGES

INTRODUCTORY NOTES

AIM

1. The aim of all stoppage lessons is to teach the soldier the automatic action he will perform whenever the gun stops firing and the causes for variases stoppages.

INSTRUCTORS NOTES

2. The Lessons are divided into :-

Lesson 31 - Introduction, Lesson 32 first position stoppage and the causes.

Lesson 33 - Second position stoppage and the causes.

Lesson 34 - Third position stoppage and the causes.

Lesson 35 - Fourth position stoppage and the causes.

Lesson 36 - Special stoppages and the causes.

Proficiency in Lessons 31 to 35 should be attained before teaching Lesson 35.

3. As proficiency is attained, training should be carried out in darkness or with No 1 and 2 blindfolded. Finally the squad should be practised in carrying out IA without the assistance of a No 2.

4. The following general points should be brought out by the instructors at the appropriate moment during the lessons :-

a. IA is not complete until the gun has been correctly relaid and fired.

b. The rear cover should never be opened or closed with the tangent sight raised.

c. If the lock cannot be drawn back, the front cover should be opened and the extractor forced down with the clearing plug handle.

d. The rear and front covers, when lowered, must always be fastened correctly.

/LESSON 31 .....

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LESSON 31

INTRODUCTION TO STOPPAGE

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube liner and belt with drill cartridges, spare parts case.

PERIODS

One period.

PREPARATION

Bring gun into action.

INTRODUCTION TO LESSON

1. Tell the squad that failures in the automatic action of the gun may be classed under two headings :-

   a. Temporary, which are due to :-

      i. Neglect of points before or during firing.

      ii. Faulty ammunition.

      iii. Ignorance on the part of the gun team.

      iv. Failure of some part of the gun of which a spare is carried.

   b. Prolonged, which are due to failure of some part which cannot as a rule be put right by the team under fire, or without skilled assistance. These necessarily put the gun out of action for a more or less prolonged period.

2. Stress that on the knowledge and training of the gun team depends the rapidity with which temporary failure can be overcome.

AIM

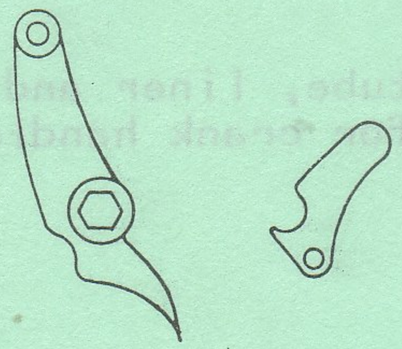
To teach the soldier to recognise the different positions.

B CONDUCT OF LESSON

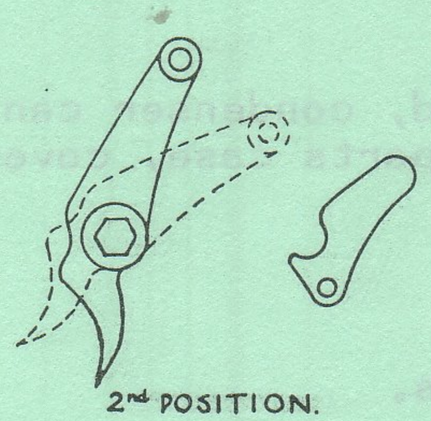
THE POSITIONS

/State .....

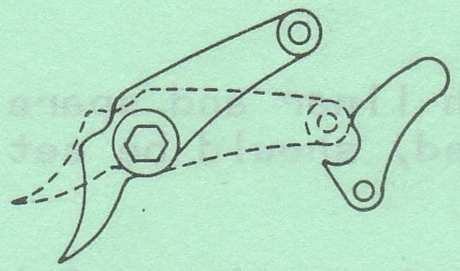
State that the IA to be carried out depends on the position of the crank handle when the gun stops. The crank handle can stop in any of the following positions :-



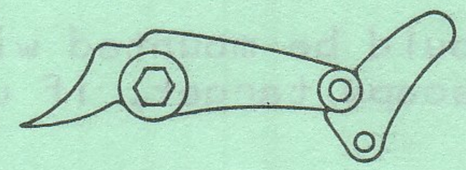
1st POSITION.



2nd POSITION.



3rd POSITION.



4th POSITION.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

LESSON 32

FIRST POSITION STOPPAGES

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscape or natural target.

PERIODS

Two periods.

PREPARATION

The gun should be mounted with liner and spare parts case in position. The landscape target, if used, should be set up in front of the gun.

The setting up of the various phases is as follow :-

Phase 1 - Half load, pull the crank handle slowly back until the horns of the extractor have engaged with the steps of the cams; pull the belt to the left and let go the crank handle.

Phase 2 - As for Phase 1 above but as soon as the No 1 presses the thumb-piece the instructor will repeat the preparation and say :- "Gun fires a few rounds and stops again," and will also disturb the aim of the gun.

Phase 3 - Half load, pull the crank handle on to the roller and the belt to left, open the rear cover and lift out the lock. Slide the cartridge on the face of the extractor half way down the lower projection of the gib and replace the lock.

The instructor must practise until he can set up the gun and remedy stoppages rapidly without fumbling.

POINTS TO BE CONSIDERED DURING LESSON

INTRODUCTION TO LESSON

AIM

To teach the soldier how to remmedy first Position stoppages and their causes.

/B CONDUCT .....

B CONDUCT OF LESSON

1A DRILL

1. Tell the squad that as live ammunition is not being used, the instructor has to manipulate the action of the gun to produce the appearance of the gun having stopped in a certain position. It is obviously of little value if the gun numbers being exercised know what position stoppage is being set up. A special drill to overcome this has been envolved.

Explain this drill. - While the gun is being set up the Nos 1 and 2 will be at the "Rest" position behind the gun with their heads turned away. As soon as the gun is set up, the instructor will cover the crank handle with a cloth , swing the gun back into position roughly aligned on the target, tighten the clamp and order "Position" raise the sights, and order "Fire".

When the cloth is removed from the crank handle it will imply that the gun has stopped firing.

PHASE 1

2. Detail a No 1 and 2, order a range and indicate a target. Set up the gun and order the No 1 to fall out, the instructor taking his place.

3. Explain and demonstrate that when the cloth is removed, ie, the gun stops, the No 1 will look and feel for the position of the crank handle. As it is in the 1st position, he will pull the crank handle on to the roller, pull the belt to the left and release the crank handle. He will then re-lay the gun and go on firing.

4. Practise the squad in the 1A for Phase 1, 1st position stoppage. When 1A is completed, the instructor should check the No 1's aim himself and invite the squad to criticize the 1A carried out.

PHASE 2

5. Set up the gun for Phase 2. Order the No 1 to fall out, the instructor taking his place. Carry out Phase 1, immediate action, and then set up the gun again and explain that whenever the failure recurs, the 1A for Phase 1 will be carried out, but that in addition $\frac{1}{2}$ lb will be taken off the fusee spring by turning the vice pin three clicks upwards.

6. Practise the squad in Phase 2, 1 st position, checking aims and getting the squad criticize the 1A.

PHASE 3

/7 Set the .....

7. Set the gun for a phase 3, 1st position, stoppage, and order the No 1 to fall out, the instructor taking his place.

8. Tell the squad that should the No 1 call for a new lock, the No 2 will take the spare lock from the spare parts case, cock it and hand it to the No 1 holding it by the side levers head. Exercise No 2 by ordering "New Lock".

9. Remove the cloth and carry out IA but point out that this time the crank handle will not go forward.

10. Demonstrate that when the crank handle will not go forward the No 1 will call for a new lock, and pull the crank handle back on to the roller. he will then open the rear cover, clear the face of the extractor, change the lock and reload. Finally he will re-lay the gun and go on firing.

11. Practise the squad in Phase 3, 1st position stoppages, checking all aims and getting the squad to criticize the IA.

CAUSES OF FIRST PHASE

PHASE 1

12. Load the gun and press the thumb-piece. Raise the rear cover and draw back the lock slowly. Tell the squad that the cause of a Phase 1 stoppage is a weak charge which does not drive the recoiling portions fully to the rear. Consequently the extractor is not able to drop as the horns do not clear the cams. When the lock begins its forward movement, the horns foul the steps of the cams. The IA remedies this by completing the backward movement and allowing the extractor to drop.

PHASE 2

13. Practise the squad in the IA for a Phase 2 stoppage.

14. Tell the squad that in this phase the extractor is not dropping due to a slow backward movement of the recoiling portions.

The horns are therefore constantly fouling the cams. This slow backward movement may be caused by :-

a. Too much weight on the fusee spring.

b. Grit, or lack of oil in the working parts.

c. Excessive packing,

d. Worn barrel.

e. Tight pockets.

/friction .....

f. Friction due to frozen oil or water.

Explain that the IA remedies the stoppage as in Phase 1 and prevents it recurring by giving a faster backward movement. But stress that the stoppage is really due to bad maintenance.

PHASE 3

15. Practise the squad in the IA for a Phase 3 stoppage.

16. Tell the squad that this stoppage is caused by a weak or broken gib spring, which allows the cartridge to slide down the face of the extractor. When the lock moves forward, the bullet strikes the barrel block A new lock will obviously remedy this stoppage.

SUM UP

Sum up the mainpoints.

CONCLUSION

Questions to and from squad.

/LESSON 33 . .....

LESSON 33

SECOND POSITION STOPPAGES

A INSTRUCTOR'S NOTES

STORES

1. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscape or natural target.

2. The following prepared rounds are required :-

One damaged round.
One separated case.
One telescoped round.

These can be manufactured by the instructor.

PERIODS

Two periods.

PREPARATION

1. The gun should be mounted with the liner and spare parts case in position. The landscape target, if used, should be set up in front of the gun.

2. The setting up of the various phases is given below :-

Phase 1 - Insert a damaged drill cartridge as the first cartridge in the belt and load.

This phase may be simulated on the range by inserting a damaged drill cartridge in the belt.

Phase 2 - Open the rear cover, lift out the lock, place the prepared telescoped round between the upper and lower projections of the gib, replace the lock and allow the crank handle to go forward under control. Lower the rear cover and pull the belt to the left.

Phase 3 - Half load, raise the rear cover and lift out the lock. Place the front portion of a separated case lightly over the bullet of the round on the extractor. Replace the lock allow it to go slowly forward, ensuring that the separation will remain in the chamber. Close the rear cover and pull the belt to the left.

/Phase 4 .....

Phase 4 - As for Phase 3 explaining that this is a recurrence.

3. The instructor must practise until he can set up the gun and remedy stoppages rapidly without fumbling.

POINTS TO BE CONSIDERED DURING LESSON

INTRODUCTION TO LESSON

Revise first position Stoppages.

AIM

To teach the soldier how to remedy second position stoppages and their causes.

B CONDUCT OF LESSON

PHASE 1

1. Detail a No 1 and 2 and indicate a target. Set up the gun and order the No 1 to fall out, the instructor taking his place.

2. Tell the squad that should the No 1 call "Clearing Plug", the No 2 will remove it from the spare parts case, push the centre pin to the rear and hold it handle upwards, convenient for the No 1 to grasp. Exercise No 2.

3. Explain and demonstrate that when the gun stops, the No 1 will look and feel for the position of the crank handle. As it is in the 2nd position, he shouts, "Clearing "lug" and knocks the crank handle on to the roller. He will open the rear cover, lift out the lock and examine the round on the face of the extractor. If he finds the round damaged, he will shout "Not required", remove the round, replace the lock and fully load. Finally, he will re-lay the gun and go on firing. The No 2 will replace the clearing plug in the spare parts case.

4. Practise the squad on Phase 1, 2nd position IA, checking all aims and getting the squad to criticize the IA.

PHASE 2

Set up the gun for a Phase 2 stoppage and ecplain tha should the No 1 find a perfectly good round on the face of the extractor with a portion of an empty case telescoped on it, he will carry out the IA as for Phase 1.

6. Practise the squad in Phase 2.

PHASE 3

/7 Set up .....

7. Set up the gun for a Phase 3 stoppage, order the No 1 to fall out, the instructor taking his place, and explain and demonstrate that should the No 1 fing a perfectly good round on the face of the extractor, he will remove it, replace the lock in the gun and keeping the crank handle to the rear take the clearing plug in his left hand from the No 2, ensuring that the centre pin is pushed back. He will insert the tapered portion into the chamber and push the pin well home allowing the lock to go forward and striking the knob of the crank handle. Then, keeping a firm pressure on the crank handle, he will rock the clearing plug handle from side to side, withdraw the lock and knock back the handle of the plug thereby withdrawing the tapered portion from the chamber. He should then check to see that the front portion of the separated case is on the plug. He will then return the clearing plug to the No 2, lower the rear cover and fully load. Finally he will relay the gun and go on firing.

No 2 will remove the separated case by pushing back the centre pin and replace the clearing plug in the spare parts case.

8. Practise the squad in Phase 3, 2 nd Position 1A.

PHASE 4

9. State that if the No 1 finds the gun is getting a series of Phase 3 stoppages, he will carry out the normal 1A and in addition change the lock.

10. Tell the squad that if this fails to remedy the succession of stoppages, the No 1 will call for a No 1 and No 2 washer from the spare parts case, and remove the lock.

He will place the washeres on the connecting rod, resting on the adjusting nut at the first opportunity.

CAUSES OF SECOND PHASE

PHASE 1

11. Practise the squad in the 1A for a Phase 1 stoppage.

12. Set up the gun for a Phase 1 stoppage and, as the crank handle is going forward the second time, explain that there is a damaged round on the face of the extractor which will not enter the breech. The position in which the crank handle will stop depends on which portion of the round is damaged. The 1A remedies the stoppage by the removal of the damaged round.

PHASE 2

/13. Practise .....

13. Practise the squad in the IA for a Phase 2 stoppage.

14. Set up the gun and tell the squad that the front portion of the previous case has been left in the chamber. Consequently the live round cannot enter the breech fully. When the live round is withdrawn, the separated case is telescoped over its nose. The IA remedies the stoppage by the removal of the telescoped round.

Phase 3

15. Practise the squad in the IA for a Phase 3 stoppage.

16. Set up the gun and explain that the cause of this stoppage is the same as in Phase 2, but that in this case the separated case remains in the chamber. The clearing plug will remove the separated case by expanding and gripping it firmly, thus remedying the stoppage.

PHASE 4

17. Practise the squad in the IA for a Phase 4 stoppage.

18. Explain that a series of separated cases is caused by ineffective sealing of the breech. There is wear somewhere between the face of the extractor and the connecting rod, and as a result the lock does not go fully forward. When the round is fired, the cartridge case breaks and leaves a portion in the breech. A No 1 and No 2 washer placed on the connecting rod will close the breech properly and prevent a recurrence. State that at the first opportunity, the washers will be placed behind the adjusting nut.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 34 .....

LESSON 34

THIRD POSITION STOPPAGES

A INSTRUCTOR'S NOTES

STORES

1. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscapes or natural target.

2. One prepared thick rimmed drill cartridge is required. This can be made by the instructor.

PERIODS

Two periods.

PREPARATION

1. The gun should be mounted with liner and spare parts case in position. The landscape target, if used, should be set up in front of the gun.

2. Setting up of the various phases is given below :-

Phase 1 - Half load and then pull the crank handle on to the roller and raise the rear cover. Pull the belt just sufficiently to move a cartridge into the face of the feedblock. Allow the crank handle to go slowly forward so that it will remain in the third position and lower the rear cover.

Phase 2 - Proceed to load, but ease the crank handle forward the second time so that it remains in the third position. As soon as No 1 has completed the IA, the instructor will repeat the setting up and say "Gun fires a few rounds and stops again," at the same time distrubing the aim of the gun.

Phase 3 - Pull out the fourth cartridge in the belt about half an inch. Half load and pull the crank handle slowly back until the horns of the extractor have engaged in the steps on the cams. Draw the recoiling portions to the rear by forcing the knob of the crank handle forward and the tail to the rear, at the same time pulling the belt to the left. Allow the recoiling portions to go forward, draw back the crank handle and then release it and it will remain in the third position.

This phase may be simulated on the range by placing a liner at an angle to the feedblock.

/Phase 4 .....

Phase 4 - Place a third rimmed drill cartridge as the second round in the belt. Fully load, easing the crank handle forward the second time. When resistance is met, give the crank handle a light tap downwards.

3. The instructor must practise until he can set up and remedy stoppages rapidly without fumbling.

INTRODUCTION TO LESSON

Revise second position.

AIM

To teach the soldier how to remmedy third position stoppages and their causes.

B CONDUCT OF LESSON

PHASE 1

1. Detail a No 1 and No 2 and indicate a target. Setup the gun and order the No 1 to fall out, the instructor taking his place.

2. Explain and demonstrate that when the gun stops, the No 1 will look and feel for the position of the crank handle. As it is in the third position, he will raise the crank handle slightly, pull the belt to the left and strike the crank handle down on to the check lever. He will then relay the gun go on firing.

3. Practise the squad in this phase, checking aims and getting the squad to comment on the IA.

PHASE 2

4. Set up the gun for the second phase, order the No 1 to fall out, the instructor taking his place. Apply the immediate action for the first phase and then set up the gun again, and explain and demonstrate that should the failure recur the initial IA is performed again and the gun is then unloaded. The lock is lifted out and rested on the hinge of the rear cover. The No 1 will then oil the lock, paying special attention to the extractor, replace the lock and lower the rear cover. He will then reload, re-lay the gun and go on firing.

5. Practise the squad in this phase.

PHASE 3

6. Set up the gun for the third phase, order the No 1 to fall out, the instructor taking his place. Tell the squad that if the No 1 calls out /"Feedblock" .....

"Feedblock," the No 2 at the appropriate moment will depress the pawls, withdraw the belt and straighten any displaced rounds.

7. Explain and demonstrate that if, after carrying ou the initial IA for the 1st phase, the No 1 cannot strike the crank handle on to the check lever he will feel the top pawls of the feedblock and if they are out and rigid he will call out "Feedblock," pull the crank handle on to the extractor on the steps of the cams, and lower the rear cover again.

The No 1 will then draw back the recoiling portions by pushing forward on the knob of the crank handle and pulling the tail of the rear while no 2 depresses the pawls and withdraws the belt. No 1 will then allow the recoiling portions to go forward while No 2 is straightening the rounds in the belt. The No 1 will bring the crank handle back on to the roller, half load, re-lay the gun and go on firing.

8. Practise the squad in this phase.

PHASE 4

9. Set up the gun for the fourth phase, order the No 1 to fall out, the instructor taking his place.

Explain and demonstrate that if the No 1 calls out "Extractor" the No 2 will take the clearing plug fromt the spare parts case, and when the front cover has been opened he will place the handle of the clearing plug on the top of the extractor holding it with his left hand, and will give it a sharp blow downwards with his right hand. He will then depress the feedblock pawls, withdraw the belt, remove the first round, and replace the clearing plug in the spare parts case.

10. Explain and demonstrate that if, after carrying out the initial IA the crank handle again will not go down on to the check lever and the pawls of the feedblock are in and slack, the No 1 will call out "Extractor." He will knock down the sights, open the front cover for the No 2 to force down the extractor, and at the same time No 1 will pull back the crank handle, holding the crank handle to the rear. The No 1 will then close the front cover, open the rear cover, lift out the lock and clear the face of the extractor, while the No 2 is withdrawing the belt and removing the first round. The No 1 will finally reload, re-lay the gun and go on firing.

11. Practise the squad in this phase.

12. Explain that sometimes it may be necessary, during the immediate action for a feedblock stoppage, for the No 2 to force down the extractor as in para 9.

/CAUSES .....

CAUSES OF THIRD POSITION STOPPAGES

PHASE 1

1. Practise the squad in the IA for a Phase 1 stoppage.

2. Set up the gun and raise the rear cover. Show the squad that a cartridge has been fed up slightly crosswise. Thus the base of the cartridge is not in line with the extractor grooves. The extractor has not been able to rise to its highest position as it has fouled the rim of the cartridge instead of accepting it smoothly in the grooves.

By easing the pressure on the lock and pulling the belt, the IA straightens the round and the crank handle can thus be knocked on to the check lever.

PHASE 2

3. Practise the squad in the IA for a Phase 2 stoppage.

4. Tell the squad that grit or lack of oil may cause friction in the lock. There is not sufficient momentum in the lock during the latter part of its forward movement to overcome this friction and consequently the extractor cannot rise to its highest position. Oiling will prevent a recurrence.

PHASE 3

5. Practise the squad in the IA for a Phase 3 stoppage.

6. Set up the gun and show the squad that the base of a cartridge has fouled the mount of the feedblock. When the slide started to move inwards, the top pawls were unable to carry the round into the feedblock. This is why the slide is out and the pawls rigid. State that the cartridge fouling the mouth of the feedblock may be due to :-

a. Loose pockets.

b. Liner not in line with the feedblock.

The IA releases the strain on the belt and enables the round to be straightened. Attention to points during firing will prevent a recurrence.

SUM UP

Sum up the main points.

/CONCLUSION.....

CONCLUSION

Questions to and from squad.

/LESSON 35 .....

101

LESSON 35

FOURTH POSITION STOPPAGES

A INSTRUCTOR'S NOTES

STORES

Gun tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscape of natural target.

PERIODS

One period.

PREPARATION

1. The gun should be mounted with the liner and spare parts case in position. The landscape target if used should be set up in front of the gun.

2. The setting up of the various phases is given below :-

Phase 1 - Load and press the thumb-piece.

Phase 2 - Load and press the thumb-piece. As soon as the No 1 has performed the IA for Phase 1, the instructor will say "Gun will not fire".

Phases 1 and 2 may be simulated on the range by inserting one and three drill cartridges in the belt respectively.

INTRODUCTION TO LESSON

Revise third position stoppages.

AIM

To teach the soldier how to remmedy fourth position stoppages and their causes.

B CONCUCT OF LESSON

PHASE 1

1. Detail a No 1 and 2, indicate a target and set up the gun.

2. Explain that when the gun stops, the No 1 will, as taught look and /feel for ....

feel for the position of the crank handle. If it is in the 4th position, he will fully load, re-lay the gun and go on firing.

3. Practise the squad.

PHASE 2

4. Set up the gun for Phase 2 and tell the squad that if the gun fails to fire after applying the IA, the No 1 will shout for a new lock, unload and change the lock, re-load, re-lay the gun and go on firing.

5. Practise the squad.

CAUSES OF FOURTH POSITION STOPPAGES

PHASE 1

6. Practise the squad in the IA for a Phase 1 stoppage.

7. State that the cartridge in the breech is not fired owing to a misfire. Alternatively an empty pocket in the belt, which will result in an empty breech, may cause this stoppage.

PHASE 2

8. Practise the squad in the IA for a Phase 2 stoppage.

9. Tell the squad that the cap of the cartridge is not struck due to a broken or damaged firing pin or a broken lock spring.

SUM UP

Sum up the main points.

CONCLUSION

10. Questions from the squad.

11. Further practice in all phases, including all positions stoppages.

/LESSON 36.....

LESSON 36

SPECIAL STOPPAGES

A INSTRUCTOR'S NOTES

STORES

1. Gun, tripod, condenser can and tube, liner with drill cartridges, spare parts case, covering for crank handle and landscape or natural target. A spare parts box is also required.

2. Two prepared thick-rimmed drill cartridges are required. These can be made by the instructor.

PERIODS

Two periods.

PREPARATION

1. The gun should be mounted with the liner and spare parts case in position. The spare parts box should be placed a few yards in the rear.

2. The setting up of the various phases is given below :-

Special A - Half load and remove the fusee box and spring. Pull the crank handle on to the roller and the belt to the left. Replace the fusee box with the spring detached from the fusee.

Special B - Place two thick-rimmed drill cartridges as the second and third rounds in the belt. Fully load but ease the crank handle forward the second time. When resistance is met, give the crank handle a light tap forwards.

Special C - Unload and press the thumb-piece. Pull the belt until the first round is in front of the bottom pawls. When the No 1 has carried out the IA for Phase 1, 4th position stoppage, he should be told that the gun fires two rounds and stops again in the same position.

Special D - (i) Give the order "Load." As soon as the crank handle touches the check lever for the second time, say "Gun firing".

Special D - (ii) Order "Load" and "Fire" followed by "Stop". Directly No 1 releases pressure from the thumb-piece, say "Gun still firing"

3. The instructor must practise until he can set up and remedy the stoppages without fumbling.

/INTRODUCTION.....

INTRODUCTION TO LESSON

State that the Immediate Actions which have already been taugt for the usual four positions will remedy most stoppages of the gun, but there still remain certain stoppages, when the crank handle may or may not stop in any of these positions, which will not be remedied by the IA already taught. Hence there is a further series of four stoppages which are classed as "Special" and have their own particular IA. In these four special stoppages, the crank handle normally stops in one of the following positions :-



SPECIAL "A" SPECIAL "B" SPECIAL "C"

SPECIAL "A" SPECIAL "B" SPECIAL "C"

AIM

To teach the soldier how to remmedy special stoppages and their causes.

B CONDUCT OF LESSON

SPECIAL A

1. Detail a No 1 and 2 and indicate a target. Set up the gun and order the No 1 to fall out, the instructor taking his peace.

2. Tell the squad that should the No 1 call for a fusee or fusee spring,

/the No 2 .....

the No 2 will get one from the spare parts case and pass it to the No 1.

3. Explain and demonstrate that when the gun stops, the No 1 will look and feel for the position of the crank handle. He may find it in any position, but it will most probably be right back. In any case he can easily identify this stoppage as there will be no tension on the crank-handle. The No 1 will remove the fusee box and identify the broken part, calling for a replace ment. The No 1 will pull the belt to the left and return the crank handle to the check lever, replace the new fusee or spring and if necessary, adjust the spring to the correct weithg. He will then re-lay the gun and go on firing.

4. Practise the squad, checking aims and getting the squad to criticize the No 1's IA.

SPECIAL B

5. Revise the squad in the IA for a Phase 4, 3rd position stoppage.

6. Tell the squad that if after applying the IA the failure recurs immediately, the IA will be repeated but with the difference that the No 1 will shout for a new lock. After clearing the face of the extractor he will change the lock. He will then reload, relay the gun and go on firing.

7. Practise the squad.

SPECIAL C

8. Revise the squad in the IA for a Phase 1, 4th position stoppage.

9. State that if at any time the No 1 calls for a new feedblock, the No 2 will call for one to the No 3, who will obtain it from the spare parts box and bring it to the gun.

10. Tell the squad that if after carrying out the IA for a 4th position stoppage the gun fires two rounds and stops again, the No 1 will shout "New feedblock", change the feedblock reload, re-lay the gun and go on firing. Explain that while waiting for the new feedblock the gun can be kept firing either by reloading and firing two rounds, or by the No 2 pulling the belt throught the feedblock from the left, and so doing the work of the feedblock.

11. Practise the squad using Nos, 1,2 and 3.

SPECIAL D

12. State that occasionally what is known as a "Runaway Gun" may occur.

/This may .....

This may take two forms and requires an IA to remedy it.

a. As the gun is being loaded and the crank handle goes forward on to the check lever for the second time, the gun starts firing and will continue to fire until the belt is expended unless it is stopped. To stop the gun, the No 1 should pull a round out of the belt a suitable distance from the feed-block. When the gun stops, No 1 will pull the crank-handle on to the roller and the No 2 will remove the belt. The No 1 will then change the lock, reload, re-lay the gun and carry on firing.

b. This may also occur during firing, when the No 1 releases pressure on the thumb-piece and the gun continues firing. The IA is exactly the same.

13. Practise the squad in dealing with a "Runaway Gun".

14. Tell the squad that if at any time the gun cannot be stopped by releasing the thumb-piece and a stoppage occurs in any position, the IA will be :-

Pull the crank handle on to the roller, remove the belt and release the crank handle.

Stress that in the case of a 2nd position stoppage, extreme care must be taken that the extractor is kept down while the round is being removed.

15. Further practice in special and all positions of IA.

CAUSES OF SPECIAL STOPPAGES

SPECIAL A

16. Exercise the squad in the IA for a Special A stoppage.

17. State that the cause of this stoppage is that either the fusee or fusee spring is broken; hence the lock crank handle will remain fully to the rear, because there is no force to draw them back forward.

SPECIAL B

18. Practise the squad in the IA for a Special B stoppage.
19. Explain that this stoppage may be caused by either :-

a. Damaged extractor grooves, which will not accept the base of the cartridge in the feedblock, or

/b. Broken .....

b. Broken gib of gib spring, which will not allow the upper projection of the gib to be depressed.

Both of these causes will result in the extractor jamming against the base of the cartridge in the feedblock and being unable to rise to its highest position. A change of lock will obviously remedy this.

SPECIAL C

20. Practise the squad in the IA for a Special C stoppage.

21. State that this stoppage is due to damage to any of the following parts of the feedblock :-

a. Upper lever. b. Lower lever.

c. Top pawls or spring. d. Bottom pawls or spring.

Damage to (a), (b) or (c) would result in the cartridges not being fed into the feedblock. Damage to (d) would mean that when the top pawls move to the right, the belt would slip back out of the feedblock.

The gun fires two rounds before stopping as there are two rounds on the face of the extractor.

SPECIAL D

22. Practise the squad in the IA for a Special D stoppage ie, "Runaway Gun".

23. State that a "runaway gun" is caused by :-

a. Broken or worn nose of the trigger and bent of the tumbler, or

b. The short arm of the lock spring being broken above the trigger axis pin.

24. Using the skeleton lock, show that either of these will result in the nose of the trigger not engaging in the bent on the tumbler. Consequently, even though pressure is re leased from the thumb-piece, directly the lock goes forward and the side levers head depresses the tail of the sear, the firing pin will fly forward and fire the round in the breech.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/LESSON 37 .....

LESSON 37

REPLACEMENT OF BREAKAGES

A INSTRUCTORS NOTES

STORES

One vehicle complete with section drill stores. If no natural landscape is available, landscape targets can be used, preferably one for each gun.

PERIODS

One period.

PREPARATION

The vehicle will be drawn up. The spare parts box will be laid out in betweeen the two guns. Gun stores should be loaded on the vehicle and the gun flags planted about 15 yards apart 15 yards in front of the vehicle. If landscape targets are being used they should be placed just in front of the gun flags.

INTRODUCTION TO LESSON

1. Detail two gun teams and a section commander's driver, order "Fall in", "Mount," "Action".

2. Engage a target, order "Rest" and move the squad to one gun.

AIM

To teach the gun teams the drill for replacing parts that are broken.

B CONDUCT OF LESSON

REPLACEMENTS OF BREAKAGES

1. Explain the system of replacing breakages :-

   a. Where the spare part required is carried in the spare parts case.
   The No 2 replaces the broken part from the spare parts case. If the lock is broken, he calls up the No 3 and hands it together with the wallet to him. The No 3 carries out the necessary repair and returns the lock and wallet to the No 2.

   b. Where the spare part required is not in the spare parts case.

/The .....

The No 2 calls for the spare part from the spare Parts box.
No 3 takes the spare part from the box and gives it to the No 2.

2. State that :-

a. All broken parts must be retained in the spare part box for examination.

b. The No 1 is responsible for seeing that the correct supply of spare parts is maintained.

c. As spare parts are used up from the spare parts case, they must be replaced from the spare parts box.

3. Practise the squad in replacing breakages. The instructor can do this by engaging a target and exercising the Nos 1 in stoppages caused by breakages.

Example : - 4th position, 2nd phase, caused by a broken firing pin.
Special stoppage caused by a broken feedblock.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/CHAPTER 6 .....

CHAPTER 6

GENERAL PRINCIPLES OF FIRE CONTROL

INTRODUCTORY NOTES

INTRODUCTION

1. The considerations which govern the methods of applying machine gun fire are :-

a. The best fire effect on the whole target.

b. Economy of time and ammunition.

c. Simplicity and speed.

d. Safety of our own troops.

The factor of surprise as applied to fire cannot be over-estimate.

Fire control orders must be framed in such a way that all these requirements are met.

The system of fire control laid down in this pamphlet is worked out on the above basis and should be adhered to. Occasionally the situation may not permit the rules given to be carried out in their entirety. Common sense and a knowledge of how the rules are arrived at will enable the best fire effect to be obtained.

BASIS OF FIRE CONTROL RULES

2. Fire effect is desirable as soon as fire is opended or immediately after. Observation of machine gun fire is only possible on certain types of ground and, particularly in European countries, can never be relied on. The opportunity of correcting fire onto the target by observation of strike will seldom occur.

There is no quick and reliable means of determining with accuracy the effect of climatic conditions. Errors, both of direction and elevation, must therefore be expected. The procedure is to define round the target an area allowing for reasonable errors of direction and elevation, and to apply fire over the whole of this area.

The rules of fire control contained in the following chapter are based on the assumption that insufficient observation of strike will be obtained to deduce the exact positions of the beaten zoned. Every endeavour, however, must be made to pick up the strike of the bullets and to correct fire accordingly. Whenever sufficient observation of fire for

/this .....

this purpose is possible, the fire control rules should not be adhered to.

DIRECT OR INDIRECT FIRE

3. The normal method of engaging a target will be by direct fire ie, by laying on the target over the sights. The main asset of direct fire is its extreme flecibility, which enables a succession of targets over a wide arc to be engaged quickly.

The machine gun is capable of firing indirect ie, the gun is laid on an aiming mark, with the elevation required to hit the target obtained and placed on the gun by means of instruments. Indirect fire is employed when it is impossible or inadvisable to occupy a direct fire position, or when shooting from the map.

The main technical advantages of indirect fire is that the necessity for indicating the target to a number of individuals is removed. The laying of the gun is mechanical and is not affected by light or distance.

The disadvantages are the necessity for additional measurements and calculations, and the difficulties of crest clearance owing to the flat trajectory.

Conditions which obstruct the field of view (eg bad visibilty, fog, smoke etc). often arise after a position is occupied. Consequently, when direct fire is to be employed, certain arrangements for indirect fire should be made as soon as time permits.

The principles and details of fire control set down in this chapter apply equally to direct and indirect fire. As the methods of fire and details of fire discipline are in many instances not the same, direct and indirect fire are treated separately.

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LESSON 38

CHARACTERISTICS OF MACHINE GUN FIRE

A INSTRUCTOR'S NOTES

STORES

Blackboard and chalk. Class require range tables.

PERIODS

Two periods.

PREPARATION

Draw the diagram given in this lesson.

AIM

To teach the fire controller the special characteristics of MG fire and their effect on the employment of machine guns.

INTRODUCTION TO LESSON

A CONDUCT OF LESSON

FIRING OF THE ROUND

1. State that when the charge in the cartridge is fired, a pressure of $19\frac{1}{2}$ tons per square inc is reached. The gases, building up this pressure very rapidly, hit the base of the bullet with a sharp blow and force it through the barrel.

2. During its passage through the barrel, the bullet is given a rotary movement by rifling of the barrel, which causes the bullet to have a steady flight. The bullet leaves the barrel with a velocity of 2440 feet a second.

TRAJECTORY

3. Explain that when the bullet leaves the barrel, two further forces act on it :-

a. Air resistance.

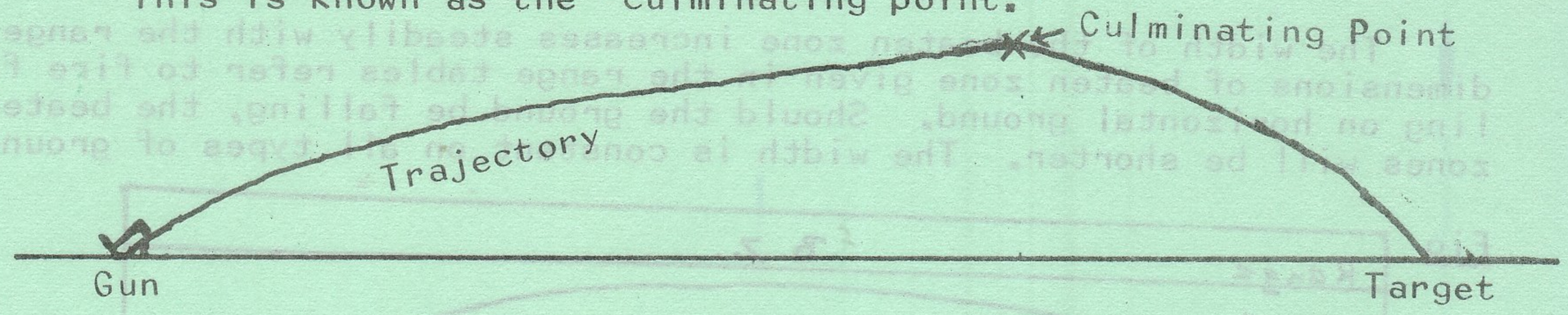
b. Gravity.

/As .....

As air resistance overcomes the velocity that the bullet has received from the force of the explosion, gravity exerts an increasingly greater effect and causes the bullet to follow a curved path towards the earth. The path of the bullet is called its trajectory.

The curvature of the trajectory becomes greater the further the bullet travels. The highest point on the trajectory is at a point approximately two-thirds of the range gun-target.

This is known as the "culminating point."

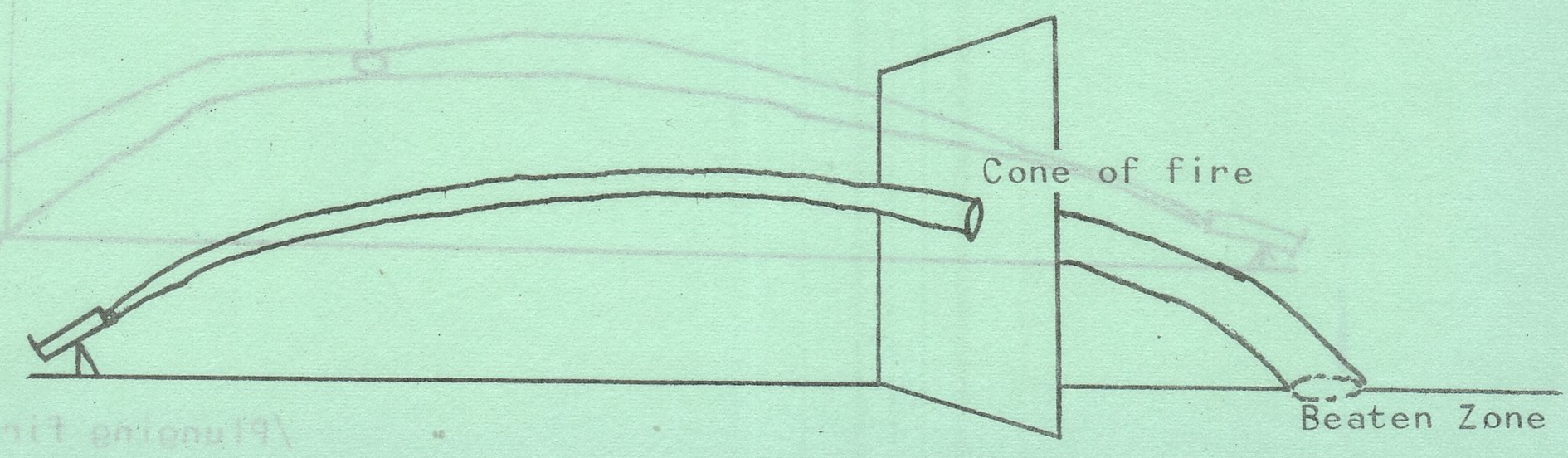


BURST OF FIRE

4. State that a burst of machine gun fire is normally 25 rounds, though in emergency longer bursts may be used.

CONE OF FIRE

5. Tell the class that owing to the slightly different elevation with each bullet leaves the gun and owing to the general vibration of the gun on its tripod during a burst of fire forms a pattern in the air, which is elliptical in shape if shown in the vertical plane. This pattern is called a cone of fire. The majority of the shots are in the centre of the cone



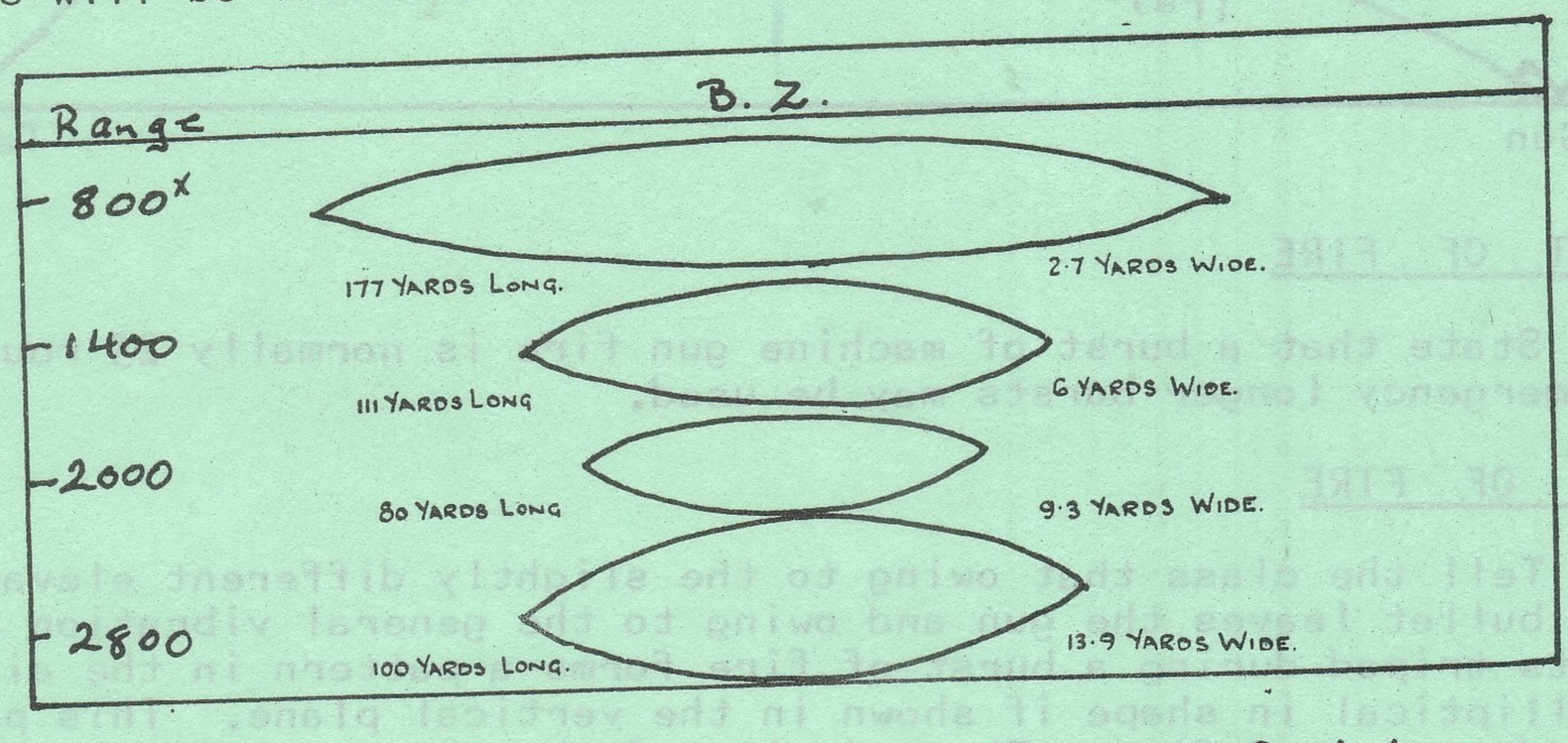
/Beaten zone .....

BEATEN ZONE

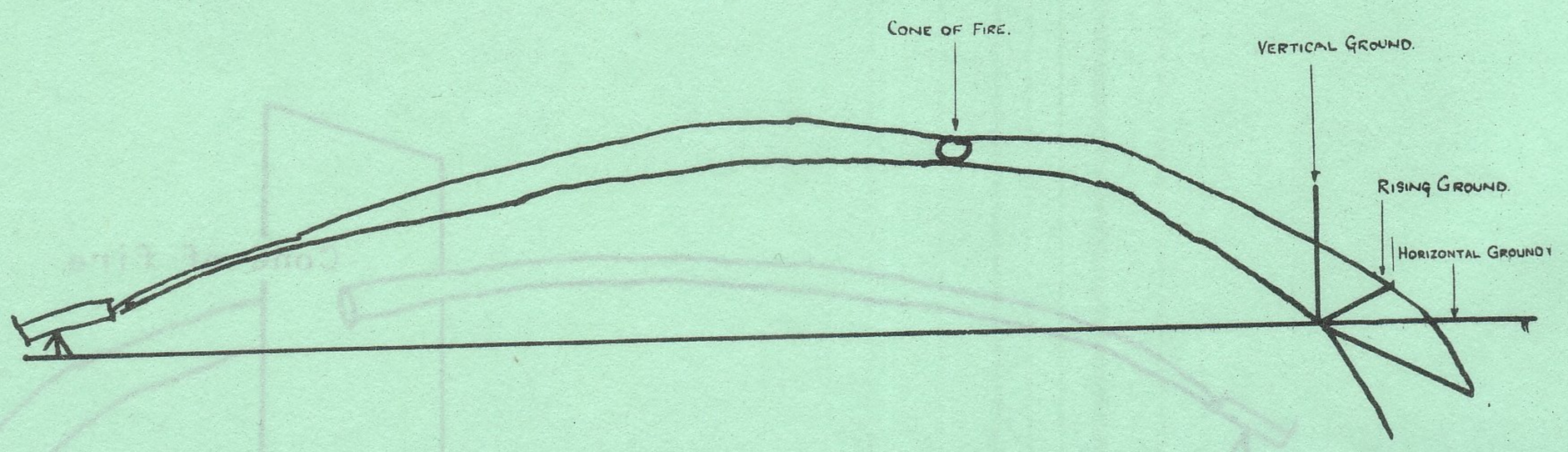
13. Explain that when the cone of fire strikes the ground it forms a long cigar-shaped pattern. This pattern is known as the beaten zone. At shorter ranges the beaten zone, due to the flat trajectory, is very long and narrow. As the range increases up to 2000 yards, the length of the beaten zone decreases due to the increased trajectory and the steeper slope of the bullet. Over 200 yards, the length of the beaten zone increases as small variations in the muzzle velocities of the bullets become more apparent.

The width of the beaten zone increases steadily with the range. The dimensions of beaten zone given in the range tables refer to fire falling on horizontal ground. Should the ground be falling, the beaten zones will be shorter. The width is constant on all types of ground.

Fig



Lengths of beaten zones for varying degrees of rising ground are given in the range tables.



/Plunging fire .....

PLUNGING FIRE

14. The beaten zone will also be shortened if guns are fired on to a target on a lower level than the gun position. This is called plunging fire and should be avoided as it reduces the neutralizing effect of the machine gun.

EFFECT OF TRAJECTORY AND BEATEN ZONE ON TACTICAL EMPLOYMENT

15. State that :-

a. Owing to the flat trajectory of the gun at ranges up to about 600 yards, the machine gun is capabel of laying a belt of fire 600 yards long on flat ground, the bullets never rising more than four feet above the ground. This is a valuable asset in defence.

b. As it is obviously desireable to place the length of the beaten zone along the target when engaging wide targets, machine guns are best sited to a flank where they can employ enfilade fire.

TYPES OF TARGETS

16. Tell the class that the types of targets that machine guns are required to engage are classified as follows :-

a. Point targets.

b. Targets with width.

c. Targets with depth.

d. Moving targets.

The methods of engaging these types of targets are taught in later lessons.

SUM UP

Sum up the main points.

CONCLUSION

1. If facilities are available, beaten zones can be demonstrated by firing onto ground or water that will show the strike of the bullets.

2. Questions to and from squad.

/LESSON 39 .....

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LESSON 39

ELEVATION

A INSTRUCTOR'S NOTES

STORES

Blackboard, gun, tripod and dial sight.

PERIODS

One period.

PREPARATION

Draw the diagrams shown below on the blackboard. Mount the gun in a position where it can be seen by the class.

INTRODUCTION TO LESSON

Emphasize the necessity of being quite clear as to the various angles involved in elevation as they will be constantly referred to when dealing with indirect fire and safety.

AIM

To teach the theory of placing elevation on the machine gun.

B CONDUCT OF LESSON

TANGENT ANGLE

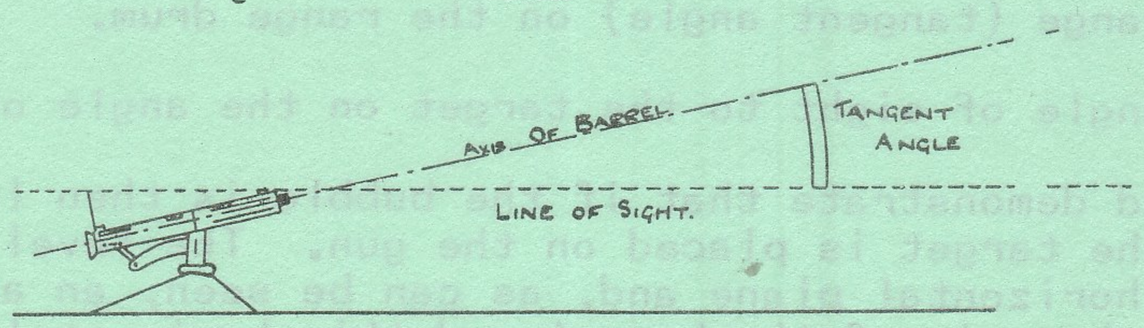
1. Choose a point on the wall on the same level as the gun and tell the class that the mark is a target at a range of, say, 1000 yards. Run the slide on the tangent sight up to 1000 and lay the gun on the target by means of the handwheel. Point out to the class that an angle has been made between the axis of the barrel and the line of sight through the backsight and foresight of the target. The process of setting the slide and laying the line of sight onto the target sets the axis at an angle above the line of sight. This angle is the "tangent angle" for the range at which the target lies.

Tangent angles for all ranges have been determined and are laid down in the range tables.

Confirm that the squad fully understand the tangent angle by revising with the diagram on the blackboard.

/Fig .....

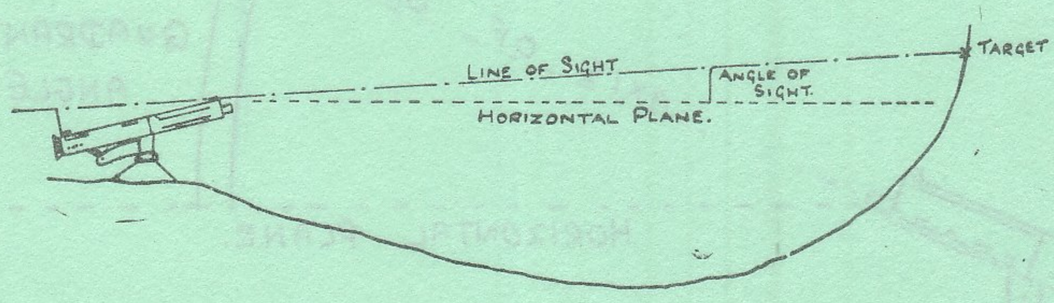
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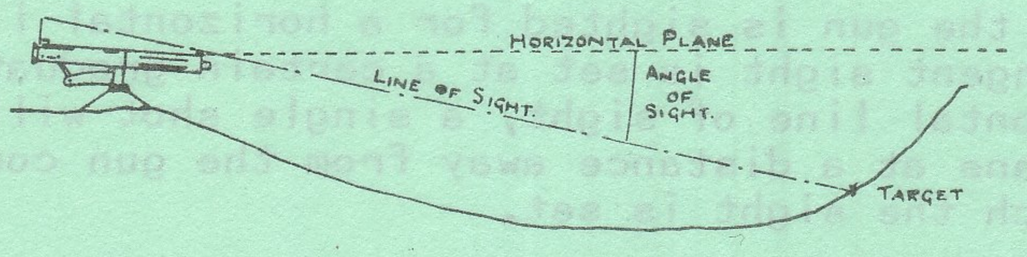
ANGLE OF SIGHT

2. Explain that the angle contained between the line of sight to the target and the horizontal plane through the gun position is called the "angle of sight". This angle is said to be positive (+) when the target is above the horizontal plane and negative (-) when it is below.

Show the angles of sight in the diagrams below.



Positive angle of sight.



Negative angle of sight.

QUADRANT ANGLE

3. Explain that, when firing indirect, elevation is placed on the gun by means of the dial sight, in two components :

/a The .....

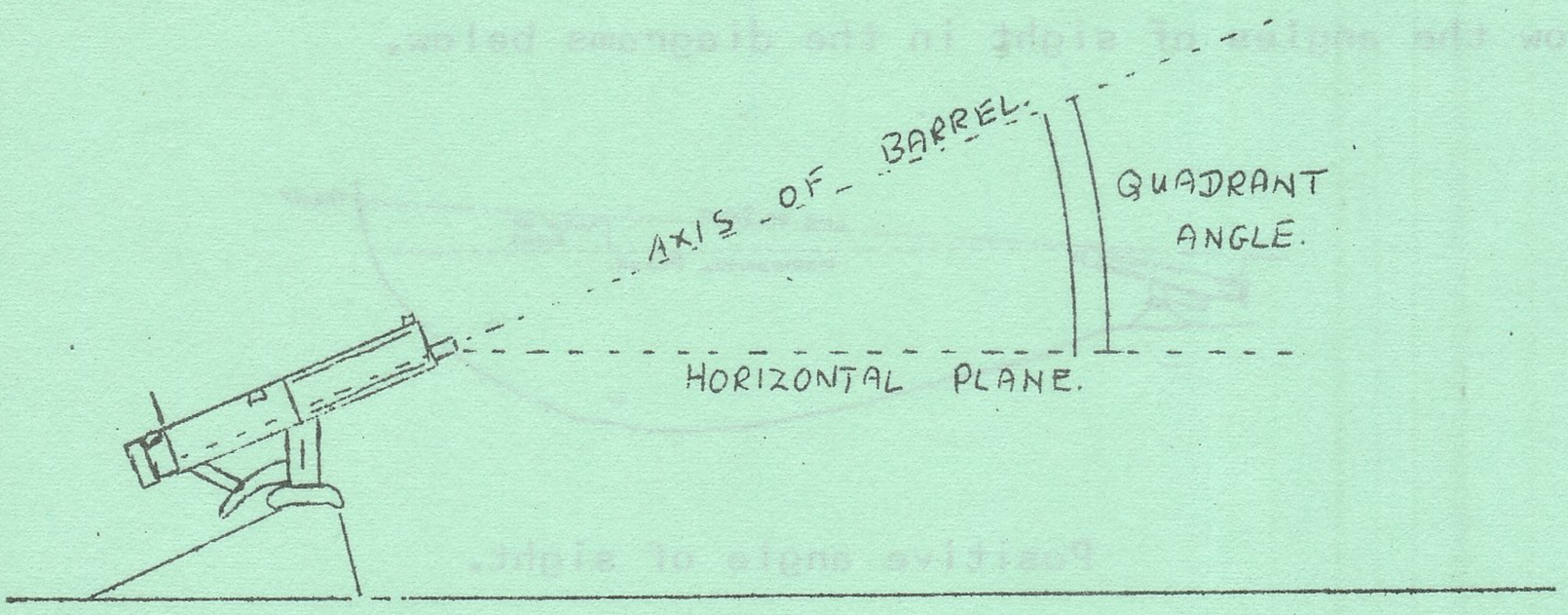
a. The range (tangent angle) on the range drum.

b. The angle of sight to the target on the angle of sight drum.

Explain and demonstrate that if the bubble is then levelled, the elevation to hit the target is placed on the gun. The levelling of the bubble forms a horizontal plane and, as can be seen, an angle has been formed between the axis of the barrel and this horizontal plane. This angle is called the "quadrant angle". It is used chiefly in recording fixed lines.

Describe, using the diagram below and previous diagrams, how the quadrant angle as composed of the tangent andgle and the angle sight and that it can be calculated from the formula :-

Quadrant angle = tangent angle ± angle of sight.



EFFECT OF NOT HAVING A HORIZONTAL LINE OF SIGHT

4. Explain that the gun is sighted for a horizontal line of sight. That is to say, the tangent sight is set at a certain graduation and the gun laid with a horizontal line of sight, a single shot will in theory strike the horizontal plane at a distance away from the gun corresponding to the graduation at which the sight is set.

As the angle of sight increases or decreases, less tangent elevation is required to cause the bullet to travel the same distance, because the force of gravity is not at right angles to lines of sight which are not horizontal.

This point may be more easily understood by the class if the instructor illustrates it by giving the example of firing upward or downward. Here no tangent elevation at all is required on the gun, as the force of

/gravity .....

gravity acts directly along the line of sight.

Explain that for angles of sight of less than 10 degrees alteration, the alteration in tangent angle required is negligible. In mountainous countries, however, it will be necessary to set the sight at a corrected range. A chart from which the corrected range for abnormal angles of sight can be obtained is given in the range tables.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from class. The class can be questioned as to the various angles of elevation by drawing diagrams on the board and getting the class to name the angles.

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LESSON 40

RANGE TABLES

A INSTRUCTOR'S NOTES

STORES

Blackboard and chalk. Class will require range tables.

PERIODS

Two periods.

PREPARATION

Give out range tables.

AIM

1. To teach the fire controller the use of the range tables.

B CONDUCT OF LESSON

RANGE TABLES

1. The instructor should explain those parts of the range tables which are described in this lesson and set simple exercises in them, until the class is thoroughtly familiar with them.

a. Pages 2 to 5.

Columns 1 and 22 give the ranges in 50's from 50 to 2800 yards. Column 2 gives the tangent angle. Column 3 gives the crest clearance, angle.
Columns 4 to 9 give the alterations for line and range when allowing for wing. Column 10 gives the number of elevations required by the combined sight rule for the different methods of determining the range. Column 11 gives the safety angle, used when calculating safety of own troops (See lesson 87) Column 12 gives the equivalent range (See lesson 87) Column 13 gives the minimum clearance. Column 14 and 15 give the depth of the lowest shot below the centre of the cone of fire and the total depth of the cone of fire. Columns 16 and 17 give the length and width of the Beaten Zone. The figures given are for 90 per cent of the total shots fired. The length of the Beaten Zone is that along the line of sight. Column 18 gives the time of flight. Column 19 gives the slope of descent. Co-

/lumn 20 .....

lumn 20 and 21 gives the corrections for elevation in climatic conditions. Columns 23 and 24 give the corresponding range for MK 8Z ammunition, and the equivalent range when using the MK 8Z sight.

b. Page 8 gives the length of the Beaten Zones on sloping ground.

c. Pages 10 and 11 give the table for firing up and downhill. Find the Target Range in columns 8 or 9 and read, on the left for downhill and on the right for uphill, to the appropriate angle of sight. This figure is the corrected range to be set on the sight.

d. Pages 12 and 13 contain the substension table which is used for determining :-

i. the width in yards of a target of known angular width at a known range.

ii. the angle of sight to an object of known height above the guns and at a known range.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the class.

2. Furhter practise if required.

3. Discuss progress made.

LESSON 41

ERRORS IN DIRECTION AND ELEVATION

A INSTRUCTOR'S NOTES

STORES

Blackboard and chalk. Class require range tables.

PERIODS

One period.

PREPARATION

Write the combined sight rule on the blackboard.

AIM

To explain the causes of error in direction and elevation and to show the means by which these errors are overcome.

B CONDUCT OF LESSON

ERRORS IN ELEVATION

1. Errors in elevation may be caused by :-

   a. Inaccuracy in determining the range.

   b. Incorrect allowance for climatic conditions.

   c. Slight inaccuracies of aim or sighting of the guns.

2. The range may be determined by ;-

   a. Rangefinder the most accurate method.

   b. Measurement on a map of not less scale than 1/25,000. The map must be in good condition and gun accurately located.

   c. Key ranging - that is by estimating from ranges taken by either of the above methods. This method is reasonably accurate up to 1,5000 yards but beyond that should only be used in emergency.

3. To ensure hitting the target, possible errors in elevation must be allowed for. To this end, the combined sight rule has been envolbed.

/Dependent .....

Dependent on the method used for determining the range, this rule gives the number of elevations to be employed at all ranges.

The number of elevations is determined from the true range before any wind allowance is made.

COMBINED SIGHT RULE

Range	Number of Elevations		
	Map	Rangefinder	Estimation or key
0 - 1000	1	1	1
1050 - 1500	1	1	3
1550 - 2000	3	3	5
2050 - 2500	5	5	-
2550 - 2800	5	7	-

Note :- When using the dial sight graduated for MK VIII Z ammunition one extra elevation, above and below the target (in addition to those shown above) will be employed at all ranges over 2000 yards. These extra elevations will not be taken into account when calculating safety or crest clearance. These extra elevations are necessary because, when giving controlledcorrections at ranges over 2000 yards and Add or Drop of 50 yards on the ground.

4. The fire controller should fire at the target with the range on the sights that he has already determined plus or minus any allowance for wind. Should the rule require 3 elevations, he will then order "All up 100, Go on." He has then fired at the supposed range to the target, the range 50 yards below the target and the range 50 yards above the target.

Should the rule require 5 elevations he will subsequently order "ALL down 150, Go on" and "All up 200, Go on." He has thus in addition, fired with the ranges 100 yards below and 100 yards above the target.

5. If the target has a difference in range to each end, the mean range will be used for determining the number of elevations required to cover possible errors in elevation.

6. If good observation of fire is obtained, the combined sight rule will not be applied. /Errors .....

ERRORS IN DIRECTION

Explain :-

7. Errors in direction may be caused by :-

a. Wrong estimation of the strength of side winds.

b. Slight inaccuracies of aim.

c. Wear in the mounting.

8. As the errors may act in either direction, it will be necessary to engage an additional width on either side of the target. Lateral errors will not be great but the beaten zone is narrow and does not give much help in overcoming them. Guns will initially be laid and fired at the target and, if necessary, tapped and fired to cover the width of the target. Then, to ensure that possible errors are covered, arrangements will be made for guns to fire one tap (15 minutes) outside the edges of the target.

9. Owing to the width of the beaten zone, if good observation of fire is obtained the tap to cover errors in direction may be cut out.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the class.

/CHAPTER 7 .....

CHAPTER 7

DIRECT FIRE

INTRODUCTORY NOTES

1. The direct fire unit is the section, because :-

   a. Two guns are required to give the necessary volume at the most usual machine gun ranges.

   b. In the event of the stoppage of one gun, sustained fire can be maintained by the other.

   c. It can easily be concealed and is not too vulnerable.

2. The requirements of fire control necessitate the two guns being under the command of a fire controller, who is supplied with a rangetaker to enable him to determine the range and to observe the fire.

3. In order to avoid casualties, the two guns of a section in action should be as far apart as possible, provided that the section commander is able to control the two guns by voice.

4. At distances beyond 2000 yards, the volume of fire produced by a section cannot always be relied upon to give results proportionate to the expenditure of ammunition, and the fire of two sections may have to be directed onto the same target from their respective positions.

LESSON 42

POINT TARGETS

A INSTRUCTOR'S NOTES

STORES

Blackboard, landscape targets.

PERIODS

One period.

PREPARATION

Select suitable targets on the landscape target. Prepare blackboard with diagrams as given in this lesson.

INTRODUCTION TO LESSON

Tell the class that a point target is a target that appears to the naked eye to have no width or depth, although it must have both.

The limits of a point target are not exceeding 30 minutes for width and 50 yards for depth.

For example, a target may well be an enemy machine gun detachment covering a width of perhaps five yards. To the gun numbers all that may be visible may be the top of a steel helmet. The width of the beaten zone might not cover the actual width of the target.

Similarly, a point target may be visible to the section commander using his glasses, but presents to the gun numbers no clearly defined point on which to lay. The section commander can indicate the target using the clock ray and degreee measurement from auxiliary reference point, but it is unlikely that the guns will be laid very accurately.

AIM

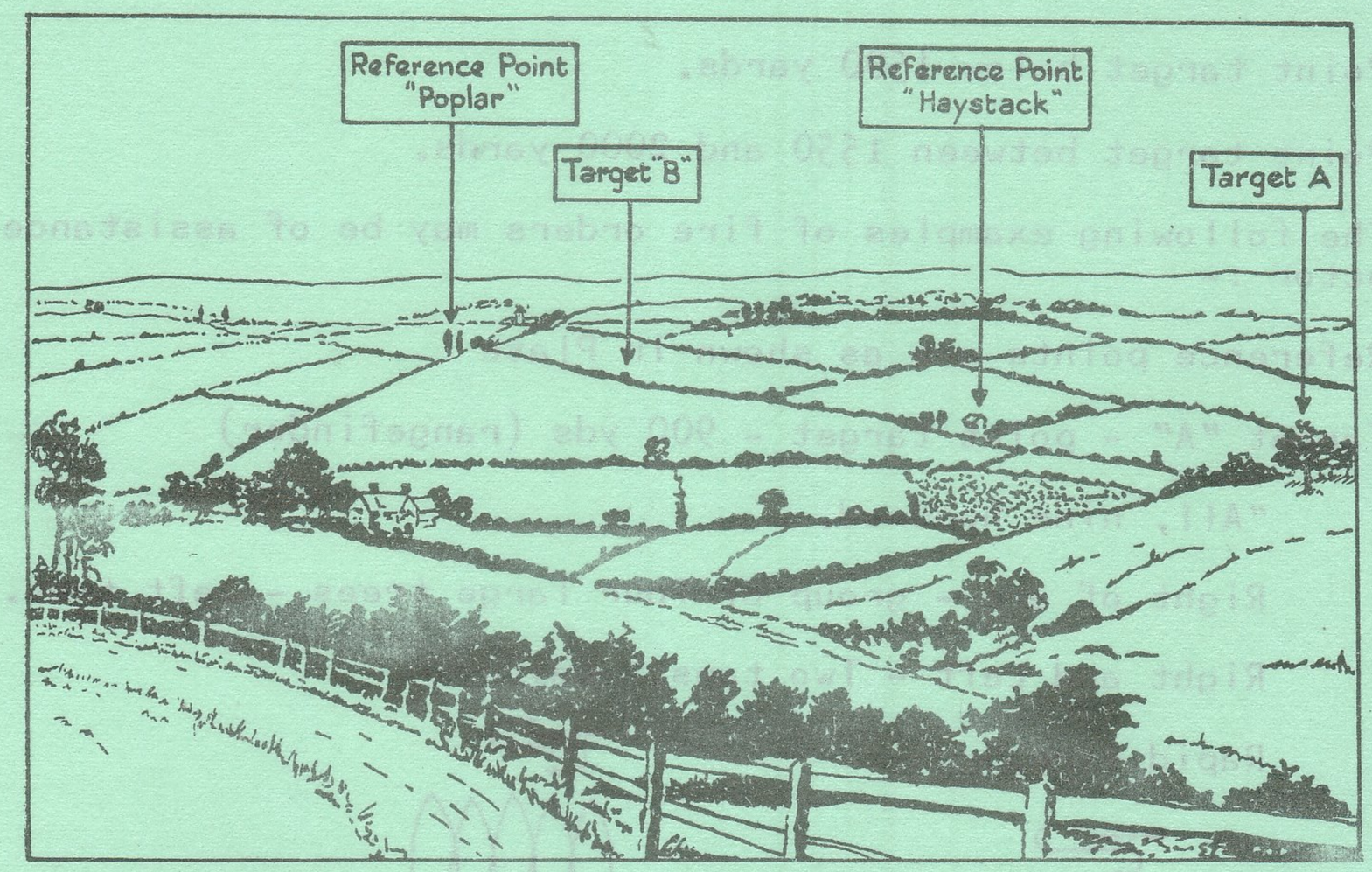
To teach the method of engaging a point target by direct fire.

B CONDUCT OF LESSON

METHOD OF FIRE

1. State that to ensure that such types of targets are effectively engaged, on extra tap right and left will always be given. This will be in addition to the tap to cover errors in direction.

/The .....


Reference Point
"Poplar"
Reference Point
"Haystack"
Target "B"
Target A

The rule is, therefore, point targets will always be engaged at all ranges with "RIGHT AND LEFT TWO TAPS."

LIFTS

2. Explain that errors in elevation will be overcome by the combined sight rule. Nos 1 tapping right and left at each elevation.

Illustrate on the blackboard a section engaging a point target at 1200 yards (key ranging).

ILLUSTRATION

3. Illustrate the engagement of the following types of target by a section :-

Point target below 1500 yards.

Point target between 1550 and 2000 yards.

The following examples of fire orders may be of assistance to the instructor :-

Reference points are as shown in Plate

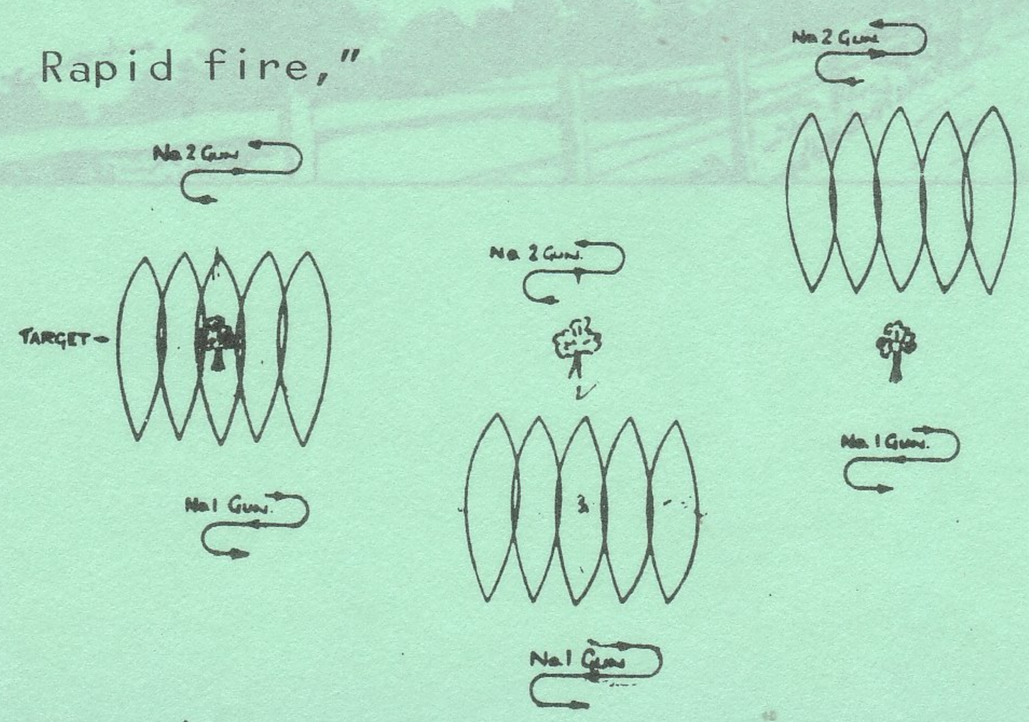
Target "A" - point target - 900 yds (rangefinder)

"All, nine hundred.

Right of arc - group of four large trees - left tree.

Right and Left - Two taps. Lay.

Rapid fire,"



ORDER:- 'ALL. 1200' 'STOP! ALL. DOWN FIFTY. GO ON' 'STOP! ALL. UP ONE HUNDRED. GO ON'

1. 2. 3.

/Target "B" .....

Target "B" - Point target - 1650 yds (key ranging.)

"All, one six fifty.

Poplar - right 3 o'clock - bush in hedgerow.

Right and Left - Two taps. Lay.

Wind, right one tap.

Fire."

"Stop.

All, down fifty.

Go on."

"Stop.

All, up one hundred.

Go on."

"Stop.

All, down one fifty.

Go on."

"Stop.

All, up two hundred.

Go on."

SUM UP

Sum up the main points.

CONCLUSION

Questions from squad.

/CHAPTER 7 .....

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LESSON 43

TRAVERSING TARGETS

A INSTRUCTOR'S NOTES

STORES

Blackboard and landscape target.

PERIODS

One period.

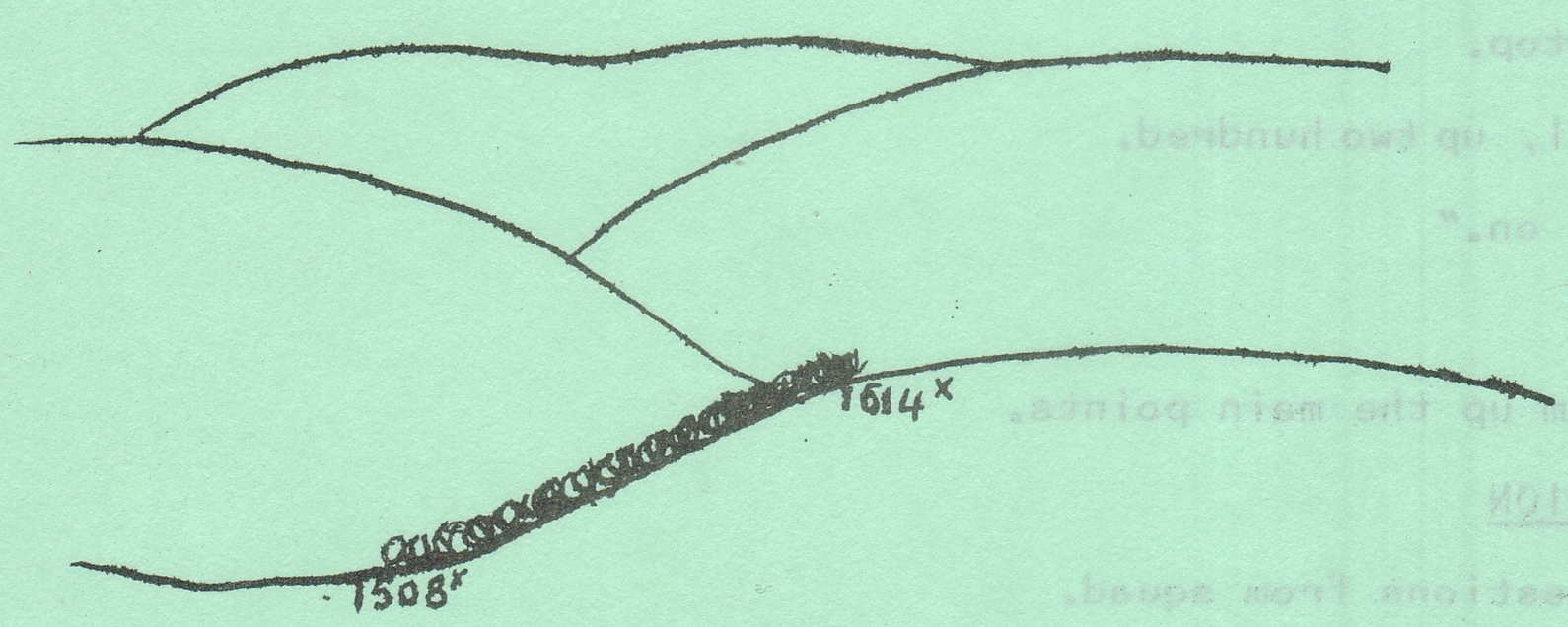
PREPARATION

Select suitable targets on the landscape target. Prepare blackboard with diagrams as given in this lesson.

INTRODUCTION TO LESSON

1. Tell the class that a traversing target is a target that appears to the naked eye to have width, eg, group of bushes, or a hedgerow.

A traversing target may well have a different angle of sight to each end, eg, a hedgerow running up the side of a hill. But so long as it has no greater difference than 50 yards in the range to each end, it is a traversing target,



2. State that a section should not engage a target more than 100 yards wide. If a target exceeds this width, it must be split up and engaged as separate targets.

/AIM .....

AIM

To teach the method of engaging a traversing target by direct fire.

B CONDUCT OF LESSON

METHOD OF FIRE

1. Explain that the method of engaging a traversing target is as follows :-

On the order "Traversing lay" both guns are laid in the centre of the target. On the order "Fire" both guns fire at the centre.

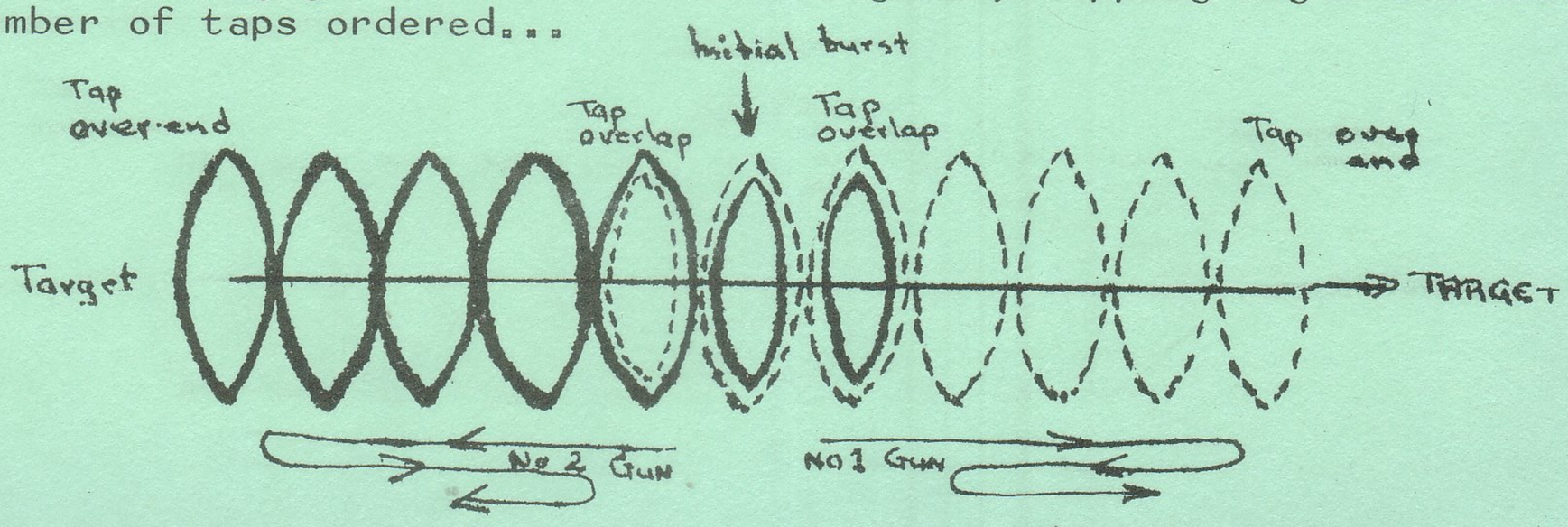
Each gun is then tapped one tap outwards, the line of sight relayed and fired again. This process is continued until the guns reach the end of the target. They are then tapped one tap out-side of the ends to cover errors in direction and then traversed back to the centre. To ensure the overlap of the beaten zones at the centre, each gun is tapped one over the centre. The line of sight is re-aligned onto the target after each tap.

LIFTS

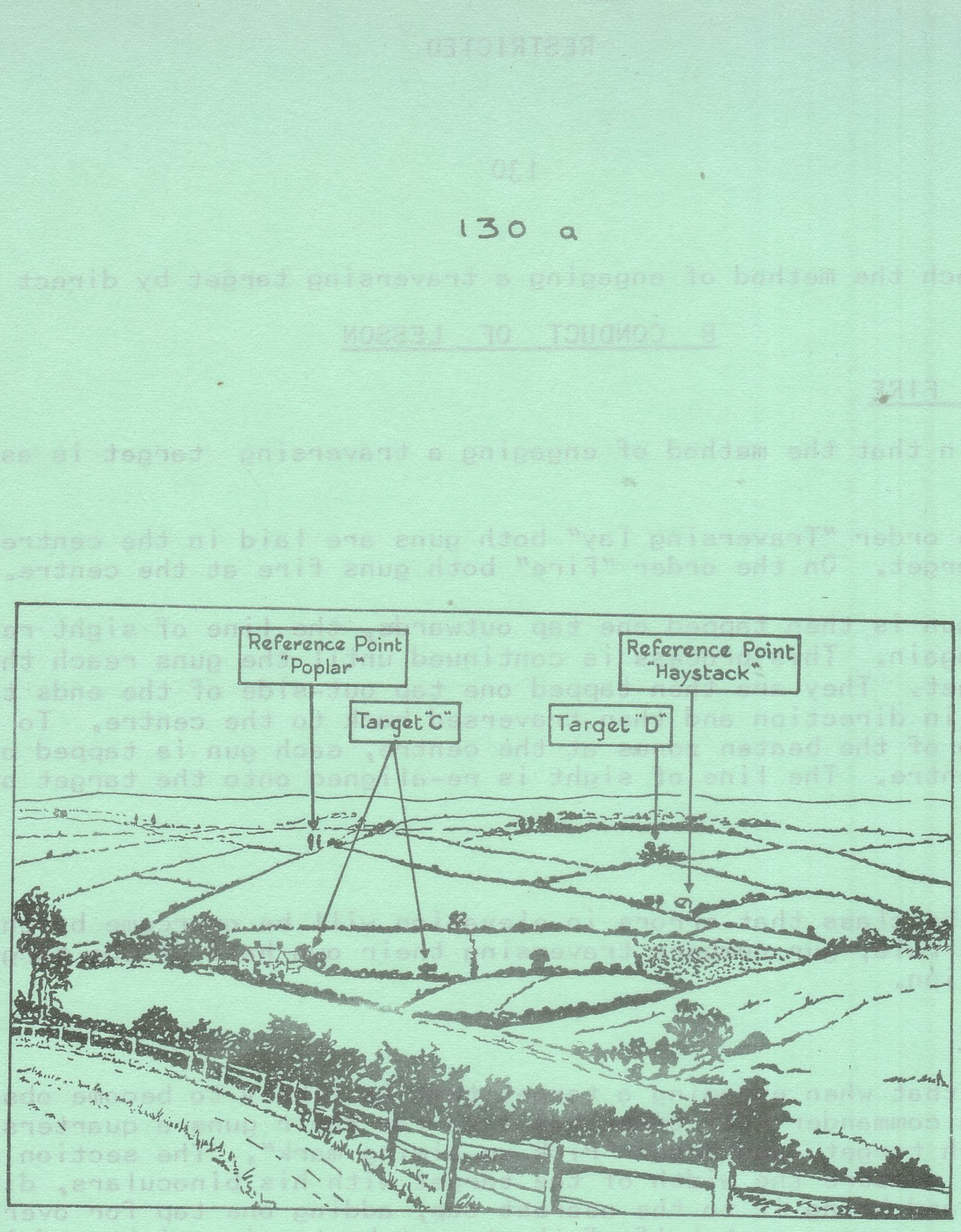
2. Tell the class that errors in elevation will be overcome by the combined sight rule, gun numbers traversing their own half of the target at each elevation.

OBSCURATION

3. State that when engaging a target that is likely to become obscured, the section commander will order Nos 1 to lay their guns a quarters way in from each target, and order "Pick up aiming mark". The section commander will measure the width of the target with his binoculars, divide it by four and bring it to the nearest tap, adding one tap for overlap. Guns can then engage each half of the target by tapping right and left the number of taps ordered...



/Example .....


Reference Point
"Poplar"
Target "C"
Reference Point
"Haystack"
Target "D"

Example :-

Target = $2^{o}40'$ wide.

$2^{o}40'$ ÷ 4 = $40'$ = 3 taps (to the nearest).

Add one tap for overlap.

Order "Right and left 4 taps".

DEMONSTRATION

4. Demonstrate the engagement of the following types of targets, by a section :-

Traversing target at all ranges.

Traversing target with a different angle of sight to each end.

The following examples of fire orders may be of assistance to the instructor :-

Reference points are as shown in Plate .

Target "C" - traversing target - 900 yards (rangefinder).

"All, nine hundred.

Poplar, - 6 o'clock - right of house - left limit.

Right 3 o'clock 2 degrees - bush - right limit.

Traversing lay.

Fire."

Target "D" 1350 yards (estimated).

"All, one three fifty.

Haystack - left 11 o'clock - group of bushes at corner of field.

Traversing lay.

Fire".

"Stop.

All, down fifty.
Go on."

/"Stop .....

"Stop.

All, up one hundred.

Go on".

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

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LESSON 44

DEPTH TARGETS

A INSTRUCTOR'S NOTES

STORES

Blackboard and landscape targets.

PERIODS

One period.

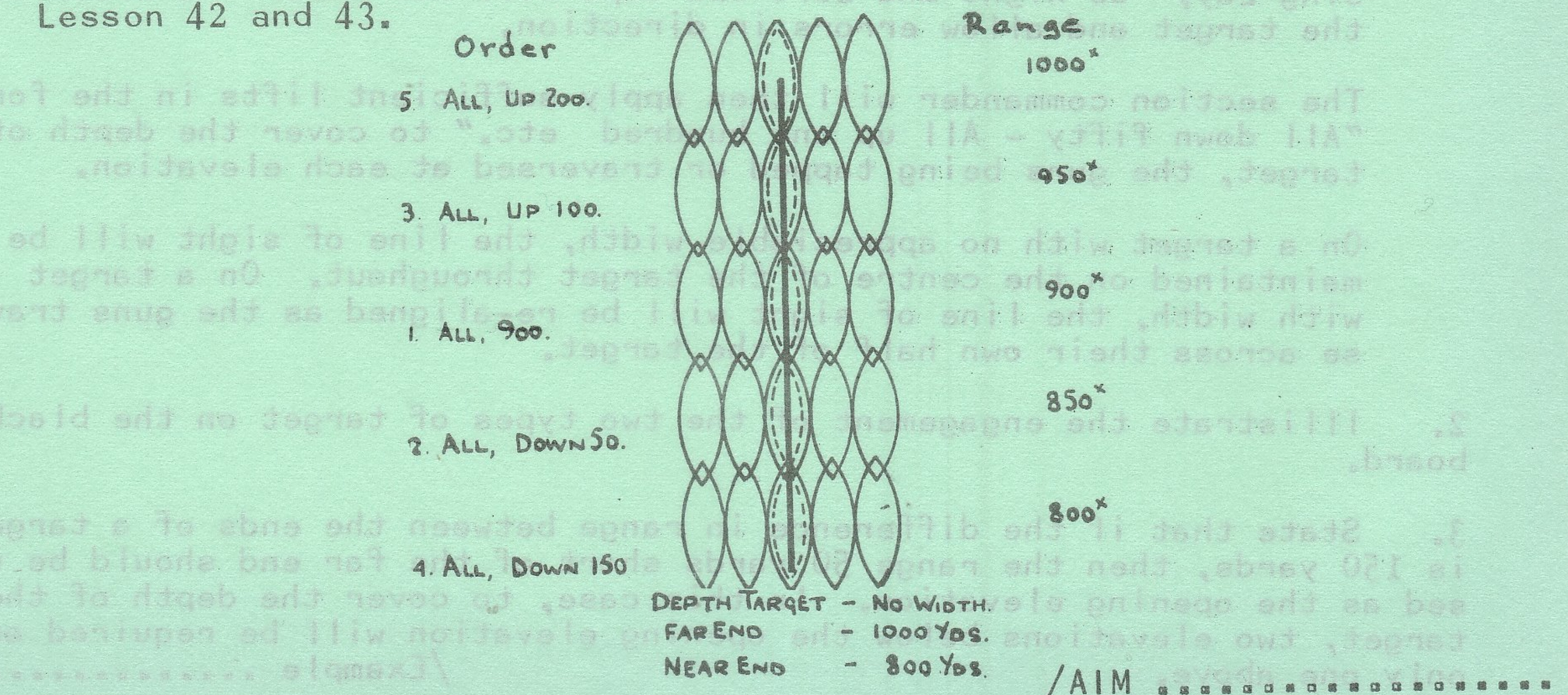
PREPARATION

Select suitable targets on the landscape target. Prepare blackboard with diagrams given in this lesson.

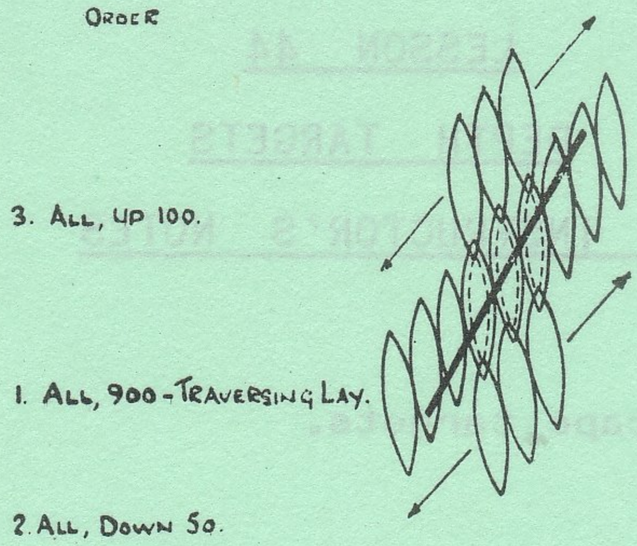
INTRODUCTION TO LESSON

Tell the class that a depth target is a target that has a difference in the range to each end of more than 50 yards. A section should not engage a target eith a greater depth than 200 yards. If a target exceeds this depth, it must be split up and be engaged as separate targets.

9. State that a depth target can take two forms, it can either have no appreciable width or it can have width. In other words, as regards direction it can either appear to be a point target or a traversing target. For direction, then a depth target should be treated as laid down in Lesson 42 and 43.



/AIM .....



AIM

To teach the method of engaging a depth target by direct fire.

B CONDUCT OF LESSON

METHOD OF ENGAGING

1. Explain that the method of engaging a depth target is as follows :-

The section commander will indicate the limits of the target and order "Halfway up. Right and Left. Two taps. Lay".

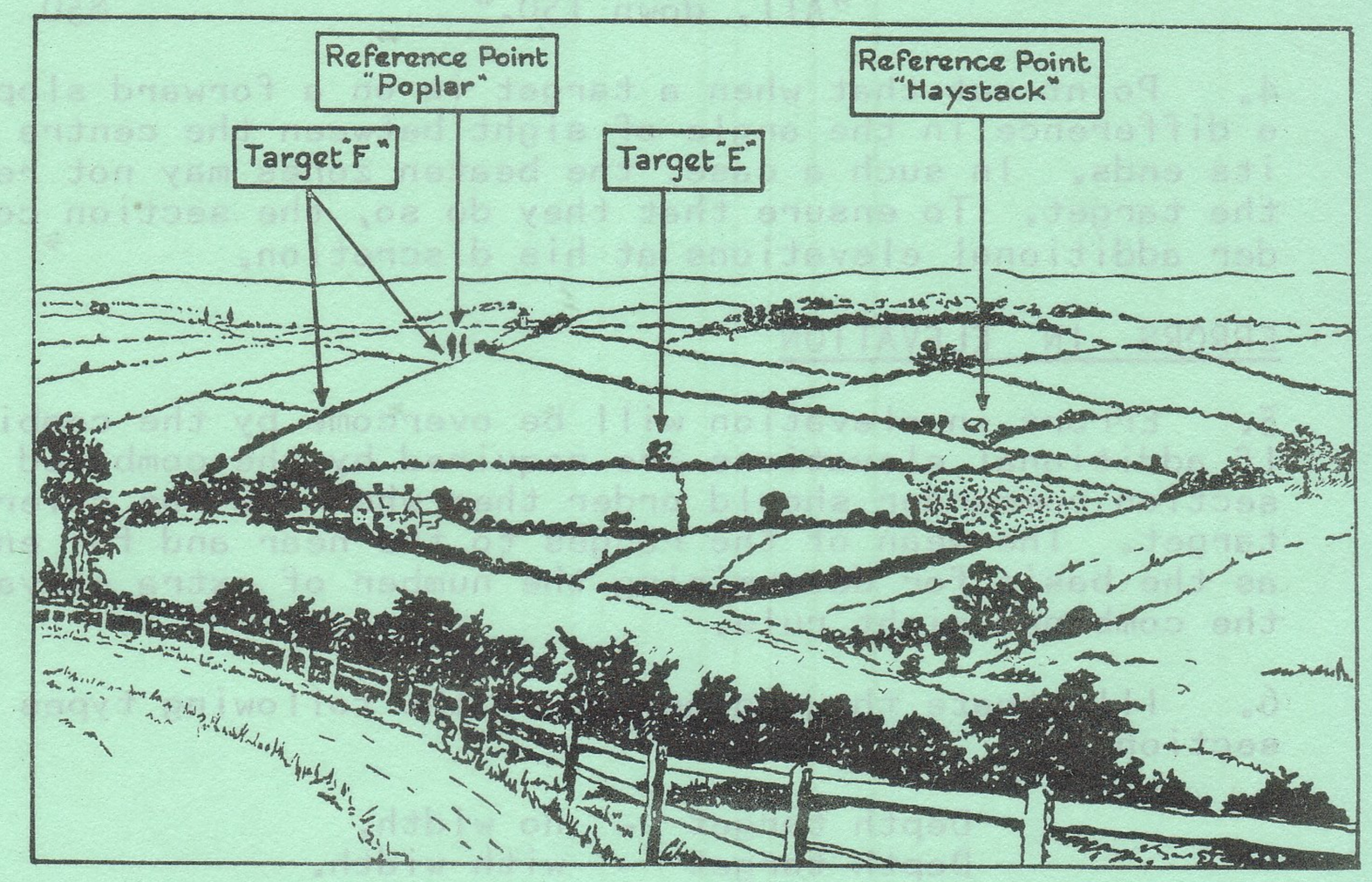
If the target is more than 30 minutes wide the order will be "Traversing Lay," as Right and Left two taps will not cover the width of the target and allow errors in direction.

The section commander will then apply sufficient lifts in the form "All down fifty - All up one hundred etc." to cover the depth of the target, the guns being tapped or traversed at each elevation.

On a target with no appreciable width, the line of sight will be maintained on the centre of the target throughout. On a target with width, the line of sight will be re-aligned as the guns traverse across their own half of the target.

2. Illistrate the engagement of the two types of target on the blackboard.

3. State that if the difference in range between the ends of a target is 150 yards, then the range 50 yards short of the far end should be used as the opening elevation. In this case, to cover the depth of the target, two elevations below the opening elevation will be required and only one above. /Example .....


Reference Point "Poplar"
Reference Point "Haystack"
Target "F"
Target "E"

Example :-

Target ..... (1000 yds far end.
(850 yds near end.

Order	Range
"ALL, 950."	950
"All, down 50."	900
"All, up 100."	1000
"All, down 150."	850

4. Point out that when a target is on a forward slope, there will be a difference in the angle of sight between the centre of the target and its ends. In such a case, the beaten zones may not reach to the ends of the target. To ensure that they do so, the section commander should order additional elevations at his discretion.

ERRORS IN ELEVATION

5. Errors in elevation will be overcome by the combined sight rule. If additional elevations are required by the combined sight rule, the section commander should order them when he has covered the depth of the target. The mean of the ranges to the near and far ends should be used as the basis for determining the number of extra elevations required by the combined sight rule.

6. Illistrate the engagement of the following types of targets by a section :-

Depth target - no width.
Depth target - with width.
Depth target - 150 yards difference in range to each end.

The following examples of fire orders may be of assistance to the instructor :-

Reference points are as shown in Plate,

Target "E" - Depth target - no width.
Far end 897 yds.
Near end 780 yds.

"All eight hundred.
Poplar, right 4 o'clock, T-shaped junction of hedgerows - Far end. 6 o'clock, end of hedgerow - Near end.

Halfway up, right and left - two taps. Lay.
Wind, Left one tap. Fire." /"Stop .....

"Stop.
All, down fifty.
Go on ."

"Stop.
All, up one hundred.
Go on."

"Stop.
All, down one fifty.
Go on."

"Stop.
All up two hundred.
Go on."

Target "F" - Depth target - with width.

Far end 1300 yds)
Near end 1200 yds) Estimated

"All, eight hundred.
Poplar, right 4 o'clock, T-shaped junction of hedgerows - Far end. 6 o'clock, end of hedgerow - Near end.

Halfway up, right and left - two taps. Lay.
Wind, left one tap.
Fire".

"Stop.
All, down fifty.
Go on."

"Stop.
All, up one hundred.
Go on."

"Stop.
All, down one fifty.
Go on."

"Stop.
All, up two hundred.
Go on."

Target "F" - Depth target - with width.

Far end 1300 yds)
Near end 1200 yds) Estimated.

/"All, one .....

"All, one two fifty.
Poplar, left 8 o'clock, junction of hedgerow - Far end.
Left 8 o'clock, another junction of - near end.
Traversing lay.
Fire".

"Stop.
All, down fifty.
Go on.") Depth of target.

"Stop.
All, up one hundred.
Go on."

"Stop.
All, down one fifty.
Go on.") Combined sight rule

"Stop.
All, up two hundred.
Go on."

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

LESSON 45

MOVING TARGETS

A INSTRUCTOR'S NOTES

STORES

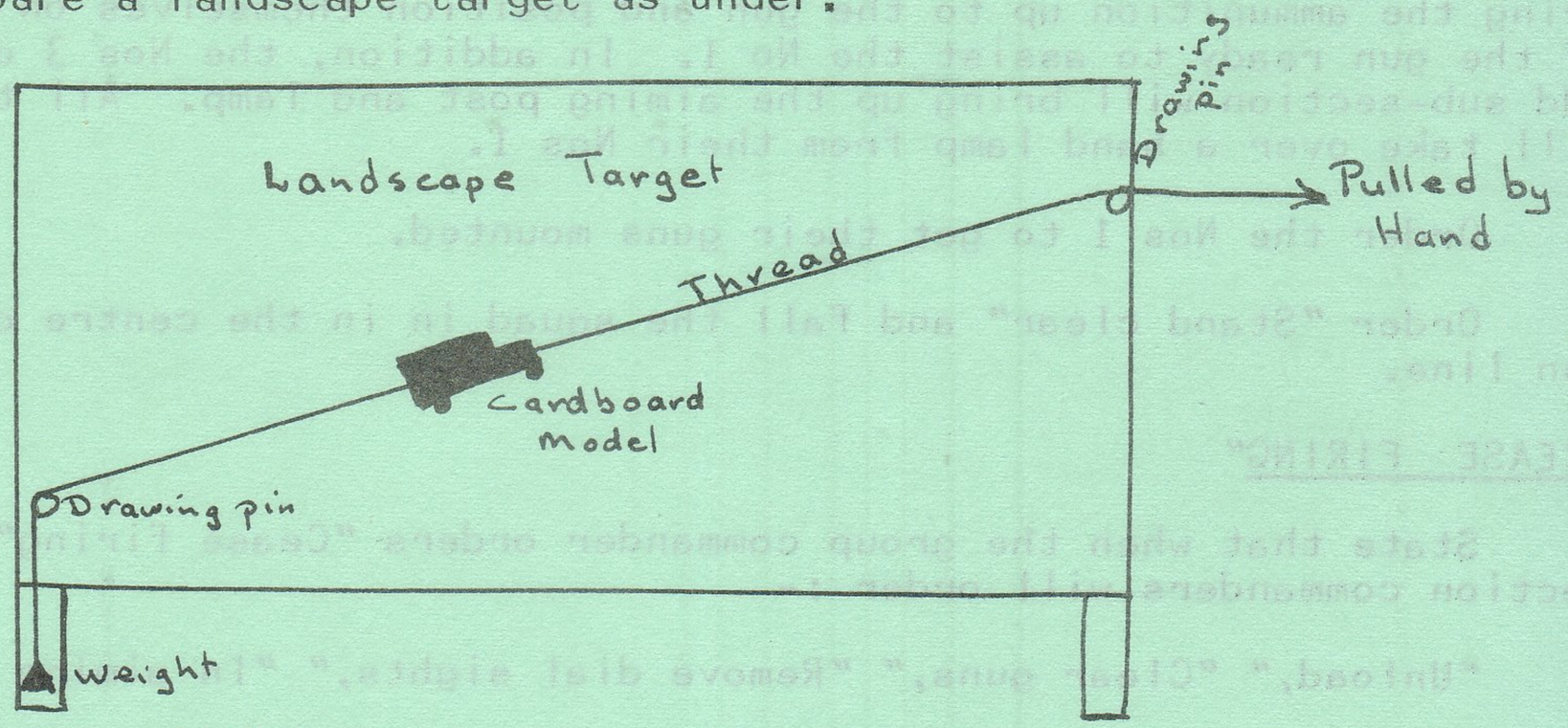
Blackboard and landscape targets.

PERIODS

One period.

PREPARATION

Select suitable targets on landscape target. To represent moving targets, prepare a landscape target as under.



INTRODUCTION TO LESSON

State that there are two methods of engaging a moving target :-

a. Engaging an area throught which the target is likely to pass This method is suitable for fleeting targets, such as infantry making use of ground, and unarmoured vehicles. It is carried out by selecting areas through which the target is likely to pass, and giving an anticipatory fire order based on the estimation of the speed and direction of the target.

b. Swinging traverse - This is a suitable method of engaging moving targets at a close range, when other methods would be to slow, or it may be used when the target is particularly suited to this method of engagement, eg, a line of infantry.

/AIM .....

ward to a position in rear of his gun flags. Each section commander will call up his Nos 1 and show them their gun flag, the direction of the rear leg of the tripod and the direction of the zero post and direction peg.

3. Section commanders should now order "Prepare for night firing", and act as in para 2 above.

COMING INTO ACTION

4. Explain that Nos 1 will order quietly "No .... gun for night firing mount gun". On that order, Nos 1 and 2 will mount their gun over the gun flag. The shoes of the tripod will not be stamped in, and the dial sight will be attached to the gun. No 3, when called up by Nos 1, will bring the ammunition up to the gun and position themselves on the left of the gun ready to assist the No 1. In addition, the Nos 3 of the odd sub-section will bring up the aiming post and lamp. All the Nos 3 will take over a hand lamp from their Nos 1.

5. Order the Nos 1 to get their guns mounted.

6. Order "Stand clear" and fall the squad in in the centre of the gun line.

"CEASE FIRING"

7. State that when the group commander orders "Cease firing", the section commanders will order :-

"Unload," "Clear guns," "Remove dial sights," "In aiming lamps".

8. Order "Fall in", "Take post," and "Load."

9. Order "Cease firing".

10. Tell the squad that the section commanders will now issue orders as in para 7 and when the aiming lamps are collected will order "Cease firing". The guns will be dismounted and the section commanders will fall in their sections and check stores. The section commander is responsible for the flags, pegs and zero posts. The section will then move back to the vehicles, replace stores and mount. Each No 1 will report to the section commander when his carrier is ready to move off.

11. Tell the section commanders to order "Cease firing".

SUM UP

Sum up the main points.

/CONCLUSION . .....

AIM

1. To teach the method of engaging moving targets by direct fire.

B CONDUCT OF LESSON

FIRE CONTROL

1. Tell the class that :-

a. Fire orders must be short and simple, otherwise the opportunity of engaging the target may be lost.

b. The section commander will maintain control until, owing to the closeness of the range or other factors, greater fire effect may be expected from gun control. He must change to gun control before unit fire control breaks down.

c. When engaging a moving target, whether by a section or gun,control, attention must be directed continuallly to :-

i. The changing line of sight, both horizontally and vertically.

ii. Alterations in range.

iii. The amount which the fire has to be directed in front of the target. This depends unpon the speed and direction of the target.

2. Explain that the appropriate angle in minutes throught which the target will travel during the time of flight of the bullets can be determined by multiplying the target speed in miles per hour by the factor 5at all ranges.

For targets moving obliquely across the line of fire, a proportion of this allowance should be given.

Guns are not tapped right and left, nor is the combined sight rule applied.

DEMONSTRATION

3. Demonstrate the engagement of a moving target by a section.

4. The following examples of fire orders may be of use to the instructor :-

Target - A lorry moving from right to left at ten mph.

/The .....

The allowance will be 10 mph x 5 = 50 minutes.

"All, one four hundred.
Left of arc - house - right 3 o'closk - hedge junction.
Lay.
Wind, left one tap.
Await my order."

The section commander picks up a point 50 minutes to the right of the hedge junction. When the target reaches this point, he gives the order to fire.

Target - Enemy advancing across field, range 400 yards.

"All, battle sight.
Enemy advancing across field.
Swinging traverse.
Fire."

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

LESSON 46

FIRE ORDERS DIRECT

A INSTRUCTOR'S NOTES

STORES

Blackboard.

PERIODS

Two periods.

PREPARATION

Write the sequence of a fire order on the blackboard.

INTRODUCTION TO LESSON

State that the following is the procedure for engaging a target by a section :-

a. The section commander by means of a fire order gives a range and indicates a point of aim on the target for both guns.

b. Each firer sets his tangent sight at the range ordered, and by tapping the gun and by use of the handwheel, directs the line of sight on to the point ordered. Thus the gun is laid initially both for direction and elevation.

AIM

To teach the sequence and layout of a direct fire order.

B CONDUCT OF LESSON

ISSUING FIRE ORDERS

1. Tell the class that fire orders are given in sequence as in para 2 below, an that the sequence must not be parted from. Rigid adherence to the sequence will ensure that errors and omissions are detected immediately, and that the gun numbers, knowing what to expect, will act more quickly.

The orders must be given loudly and clearly, the section commander facing towards the guns. He must make up his mind what is the correct order to give before embraking on it. Long and unnecessary pauses, during which he is coming to a decision as to the next part of the order, /can .....

can result only in inaccurasiesand slovenly drill.

THE BEST ORDER IS THAT WHICH GETS BULLETS ONTO THE TARGET IN THE SHORTEST POSSIBLE TIME

SEQUENCE

2. Point out the sequence of a fire order :-

Designation.
Range (including wind allowance, if necessary.)
Indication of the target.
Method of fire.
Lay.
Side wind allowance.
Rate of fire.
Order to fire.

3. Explain that when giving out the order, pauses should be made as under, until it is seen that the gun numbers are ready for the next part of the order :-

After the range	To allow time to set the sights.
At various stages during the indication	Time must be given for points to be recognized. When degree method of indication is used, a pause must be made to enable the angles to be measured.
After method of fire	To enable the guns to be laid.
After wind allowance	To allow time to pick up an aiming mark.

EXPLANATION OF HEADINGS IN FIRE ORDER

4. Explain each heading of the fire order as under :-

a. Range

i. Ranges when ordered to the guns will be given to the nearest 50 yards and according to the examples in Lesson29 , para 12.

ii. For the first target the section commander will usually obtain the range from the rangetaker but, where the situation demands it, he should not hesitate to estimate the range. For subsequent targets, to save time, ranges can be key ranged.

/iii When .....

iii. When the range is ordered to the guns, it will be preceed by the word "All," eg, "All - one two hundred".

iv. If the wind is sufficiently high to warrant a correction to elevation, the range will be corrected before being given out.

b. Indication - The section commander will indicate the target as laid down in Target indication. Reference points and degrees should be used only when they are in order to indicate the target clearly.

c. Method of fire - This is depended on whether the target has width, depth or neither. It may take any of the following forms :-

i. "Right and left - two taps "Lay".
Both guns are laid on the target. When "Fire" is ordered they are fired and tapped TWO TAPS right and left of the target. No 1 gun starts tapping to the right first and the No 2 gun to the left.

ii. "Traversing Lay".
Both guns are laid on the centre of the target.
When "Fire" is ordered each traverses its own half of the target.

iii. "Half way up - Right and Left - Two taps "Lay" Both guns are laid halfway up the depth of the target. When "Fire" is ordered each gun acts as in sub-para (1).

d. Side wind - The section commander will calculate the effect of the side wind to the nearest tap (Lesson 40). It will ordered to the guns in the following from :-

"Wind - Right (or left) "Taps".
No 1 tap their guns across by the number of taps ordered, pick up an aiming mark and report "On".
If the allowance is one degree or more, it should be ordered in degrees.
No 1 by means of a hand angle will pick up an aiming mark.
If no corrections is needed, this heading is omitted from the order.

e. Rates of fire - If no order is given, normal is implied. If it is desired to fire rapid, the order "Rapid" will be given before the order to fire.

f. The order to fire - Thiw will normally be given by the order "Fire".

/ORDERS .....

ORDERS DURING A SHOOT

5. State that the following orders may be given out during a shoot :-

a. "Stop" This order is normally given by signal.

b. Ranging corrections. These may be for :-

i. Direction - The section commander converts the necessary correction into taps or degrees (if more than three taps) and orders it to one or both guns as required. No 1 note the new aiming point.

Examples -

"All, right two taps ".
"No 1 gun, left one degree".

ii. Elevation - The section commander decides on a new range or the correction required and gives out.

Examples :-

"All, one four hundred"
"All, down fifty"
"No 1, up fifty"

c. "Go on" This order may be given verbally or by signal.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/LESSON 47 .....

LESSON 47

APPLICATION OF DIRECT FIRE ORDERS

A INSTRUCTOR'S NOTES

STORES

Vehicle complete with stores, portable blackboard, chalk and natural targets.

PERIODS

Two periods.

PREPARATIONS

The instructor should select targets of various types and decide on ranges before the lesson begins. The guns should be mounted 6 - 8 yards apart facing the arc.

POINTS TO BE CONSIDERED DURING LESSON

This lesson must be a practice on lessons 42, 43, 44, 45 and 46.

INTRODUCTION TO LESSON

Practice squad in recognising the different types of targets on natural landscape.

AIM

To teach the soldier how to act on the various parts of a direct fire order.

B CONDUCT OF LESSON

POINT TARGETS

1. Detail a No 1 and 2 for each gun and order "Fall in" and "Take Post." Divide the rest of the squad into two groups, one behind each gun.

2. State that a Point target is always engaged with right and left two taps to make sure that the target is hit. Explain how the No 1 applies "Right and left two taps."

3. Explain that the side wind allowance is ordered in taps up to one degree. If the allowance is of one degree or more, it is given in degrees.

/4. Give .....

4. Give a fire order onto a Point target, explaining the duties of No 1 at each stage of the order :-

Order		Action of No 1
a.	Designation	Becomes fully alert to receive the fire order.
b.	Range	Raises the tangent sight and sets the slide.
c.	Indication	Follows the indication and locates the target.
d.	Right and left two taps, Lay.	This order indicates to the No 1 that he must engage the target with right and left two taps . The No 1 lays the gun, grasps the traversing handles correctly, raises the safety catch and reports "On".
e.	Wind right (or left) ..... taps. or Wind right (or left)..... degrees.	Taps the number of taps ordered and looking through the sights, picks up the new point of aim, Reports "On". With the aid of handangles pick up the new point of aim, relays and reports "On."
f.	Rate of fire	i. If "Rapid is ordered, he then prepares to fire rapid. ii. If none is mentioned, he then knows that normal fire is required.
g.	"Fire"	Presses the thumbpiece. Taps right and left two taps, checking his aim whenever he has tapped onto the point of aim.

5. State that the No 2 must at all times be prepared to take over as No 1. He must therefore know the range on the gun, the target and wind allowance.

6. Practise the squad in engaging Point targets. After each target is engaged, get the rest of the squad to criticize the action of No 1 and 2

TRAVERSING TARGETS

7. Explain the method of engaing a traversing target.

8. State that on the order "Traversing Lay," the No 1 will lay on the centre of the target, raise the safety catch and report "On". Emphasize that when firing, the line of sight is re-aligned after each tap.

9. Practise the squad in engaging traversing targets,

/DEPTH .....

DEPTH TARGETS

10. Explain the method of engaging a depth target.

11. Tell the squad that the method of fire will be either "Halfway up, right and left two taps, Lay," or "Traversing Lay," depending on whether the target has width or not. On either order, the No 1 will lay halfway up the target, raise the safety catch and report "On". When firing, if "Halfway up, right and left two taps Lay", has been ordered, the No 1 will maintain his point of aim halfway up throughout. If "Traversing Lay," is ordered, the No 1 will realign his point of aim onto the target after each tap.

12. Practise the squad in engaging depth targets of both types.

SUM UP

Sum up the main points.

CONCLUSION^

Questions to and from squad.

/CHAPTER 8 .....

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CHAPTER 8

LESSON 48

EXAMINATIONS TEST AND ADJUSTMENTS (1)

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spare parts box and case.

PERIODS

One period.

PREPARATION.

Gun and tripod mounted with the rest of the stores laid out on a table.

AIM

To teach the soldier how to examine and test parts of the gun to see that they are in working order and if necessary to carry out certain adjustments.

B CONDUCT OF LESSON

EXAMINATIONS AND TESTS

1. Describe the points to look for in examining and testing the following parts :-

   a. Muzzle attachment - Should be free from fouling or burrs, the disc clean, and the split pin and chain in good condition. The blast deflector should be fitted correctly.

   b. Muzzle cup - Should be clean and the threads neither damaged nor worn.

   c. Steam tube - The keeper screw should be in its correct position and the sliding valve working. This can be tested by rocking the gun.

   d. Foresight - The blade should be in good condition.

   e. Front cover catch - Should be in working order.

/f. Fusee .....

f. Fusee spring and fusee - These should be in good condition. The vice pin should not be bent.

g. Tangent sight - The apertuers should be undamaged, the top and bottom screws secure and the slide moving freely.

h. Rear cover catch - Test the automatic fastening of the rear cover when closed and that the rear cover lock screwed axis pin is tight.

j. Safety catch - Test the automatic action of the spring.

WEIGHING AND ADJUSTING THE FUSEE SPRING

2. Explain and demonstrate the method of weighting the fusee spring. The lock should be removed and the loop of the spring balance placed over the knob of the crank handle. The balance should then be pulled vertically upwards. The reading indicated when the crank handle begins to move will be the weight or tension of the fusee spring. The mean of three readings should be taken and the weight should be between seven and nine pounds.

3. If the spring is over or under weight, the weight can be adjusted by the vice pin. Generally, six clicks or three complete revolutions of the vice pin make a difference of about one pound. Turning the vice pin upwards decreases the weight and downwards increases the weight.

4. State that the tension of the fusee spring should always be kept as high as possible during firing, consistent with maintaining a rate of fire of about 500 rounds per minute.

5. Practise the squad in weighing and adjusting the fusee spring.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the class.

2. Questions to the class on examinations and tests, and further practise if necessary in weighting the fusee spring.

/LESSON 49 .....

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LESSON 42

EXAMINATIONS, TEST AND ADJUSTMENTS (2)

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spare parts case, drill cartridges, wall diagram and a pointer.

PERIODS

One period.

PREPARATION

Gun mounted with the remaining stores laid on a table.

AIM

To teach the soldier how to examine and test parts of the gun to see that they are in working order and to carry out certain adjustments.

B CONDUCT OF LESSON

EXAMINATIONS AND TESTS

1. Describe the method of examining and testing the following parts :-

a. Firing lever - Ensure that the thumb-piece cannot be pressed in unless the safety catch is raised.

Ensure that when the safety catch is raised and the thumb-piece pressed the lock is fired.

b. Trigger bar and spring - Inspect for burrs or roughness on the trigger bar. Make sure that the spring forces the trigger bar forward quickly.

c. Connecting rod - See that the adjusting nut is tight.

TESTING THE RECOILING PARTS.

2. Describe and demonstrate the method of testing the recoiling portions This is done by removing the fusee spring, putting the crank handle vertical and working the recoiling portions backwards and forwards. They should move freely.

3. State that the recoiling portions must be weighed periodically.

/Explain .....

Explain and demonstrate how this is done. The fusee spring is removed and the crank-handle raised until it is vertical. The loop of the spring balance is placed over the right end of the crankshaft and pulled slowly to the rear. Immediately the recoiling portions begin to move, the weight shown on spring balance is read. The mean of three readings should be taken and should not exeed four pounds.

4. Practise squad.

TESTING THE LOCK

5. State that there are five test for the lock, each designed to test a different portion. The lock should pass each test, before being subjected to the next one. Explain and demonstrate these tests using the gun and wall diagrams :-

a. Side and extractor levers - The feedblock should be removed and and the front cover left raised. The crank is drawn back on to the roller and then released. With the finger and thumb, the extractor is now tested for vertical play. If the extractor can be moved vertically, it indicates that the side or extractor levers are worn.

b. Bents of sear and firing pin - With the feedblock removed and the front cover raised, the crank handle is drawn back on to the roller. Keeping the thumbpiece pressed, the crank handle is allowed to go slowly forward on to the check lever. If the extractor jumps upwards as the firing pin goes forward, it indicates that the bents of the sear and firing pin are worn, and the striker is hitting the wall of the firing pin hole in the rear of the extractor.

c. Extractor - The face of the extractor should be examined for burrs or flaws. If there is any doubt, a good drill cartridge should be slid along the extractor grooves.

d. Nose of the trigger and bent of the tumbler - The lock is cocked and the sear depressed. The firing pin should be held back by the nose of the trigger engaging in the bent of the tumbler. If it is not, then these are worn.

e. Firing pin - First, see that the point of the firing pin is broken. A breakage in the body of the firing pin can be recognized without stripping the lock. The lock is released with the extractor raised. If undamaged the firing pin will then protrude from the firing pin hole. If it does protrude, or if it does protrude and is not withdrawn, when the lock is re-cocked, some part of the firing pin is broken.

/6. Practise .....

6. Practice the squad in the lock tests.

WEIGHING THE LOCK SPRING

7. Tell the squad that the lock must be weighed periodically to test the tension of the lock spring. Describe and demonstrate the procedure for doing this. The lock should be removed. With the crank handle held on the roller, the lock is then re-inserted in the gun but not connected on to the connecting rod. The connecting rod is then allowed to fold and go under the crankshaft, and the crank handle allowed to go forward. The lock is now held firmly in the gun eith the side levers head free to move.

The loop of the spring balance is placed over the side levers head and drawn slowly upwards. Directly the tail of the tumbler moves, the reading is taken. The mean of three readings should be assessed and should be between 12 and 14 pounds.

8. Practise the squad in weighing the lock.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the squad.

2. Further practice as time allows in the tests. Soldiers should be required to explain their tests during practice.

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LESSON 50

EXAMINATIONS, TESTS AND ADJUSTMENTS (3)

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spare parts box and case, asbestos packing and as many spare barrels as are available.

PERIODS

One period.

PREPARATION

Gun and tripod mounted. The other stores should be laid out on a table.

INTRODUCTION TO LESSON

Emphasize that a high degree of skill in packing the barrel is required. The efficient functioning of the gun depends to a large extent on good packing.

AIM

1. To teach the soldier further examinations and tests.

2. To teach the soldier to examine and pack the barrel.

B CONDUCT OF LESSON

EXAMINING THE BARREL

1. Tell the squad that the barrel should be examined for rust, cuts, erosion, bulges or metallic fouling. Explain that erosion is the pitting of the barrel caused by the force of explosion and is most liable to occur at the breech end of the barrel.

2. Describe and demonstrate the best method of examining the barrel. The barrel should be removed from the gun. Holding the barrel, first close to the eye and then some distance from the eye, the bore should be examined. The examiner should look at the walls of the barrel and not look through it. The barrel should be rotated slowly to make sure that no portion is missed. The lead should be carefully examined to see if undue erosion has taken place. The barrel should now be reversed and examined carefully from the muzzle end in a similar manner. Point out

/that .....

that metallic fouling may cause inaccuracy in shooting.

PACKING THE BREECH END OF THE BARREL

3. State that if the gun leaks at the breech end, the packing is at fault and must be removed and renewed. The barrel casing must first be emptied and the recoiling portions removed.

4. Explain and demonstrate the method of packing the breech end of the barrel. A strand of asbestos is first rubbed between the hands to make it thin and compact, and is then wound in the cannelure of the barrel and pressed together with a thin piece of wood or the point of a screwdriver until the cannelure is full. The asbestos is then smoothed down flush with the barrel. Before replacing the barrel in the gun, the packing is soaked in oil; this will swell the packing and give a tighter fit and also reduce friction.

5. Practise the squad.

PACKING THE MUZZLE END OF THE BARREL

6. Explain and demonstrate how to pack the muzzle end of the barrel. The muzzle attachment is removed and the padking gland unscrewed. A lenght of asbestos is then oiled and wound loosely round the barrel, and as it is wound it is pushed in with a piece of wood or a screwdirver, until it is just behind the front cap of the barrel casing. The gland is then screwed on hand tight. The lock is hung and the recoiling portions worked by hand to ensure they move freely. If the packing is too tight, the gland can be removed and one or two strands of asbestos taken out. Finally the packing gland is screwed home using the combinatoon tool.

7. Practise the squad.

TESTING THE PACKING

8. State that the packing should be tested by putting into the barrel casing sufficient water to cover the barrel, and working the recoiling portions backwards and forwards. There should be no leakage.

Finally the recoiling portions should be tested for correct weight.

TESTING AND EXAMINING MISCELLANEOUS PARTS

9. Show the squad the points to look for when examining the feedblock. The slide should be working freely and the pawls and springs in good condition.

/10. Point .....

10. Point out the parts of the sliding shutter that require attention. The catch and spring should work automatically and the shutter should move freely. If the shutter is difficult to move, it should be examined for :-

a. Dirt of grit.

b. Dented bottom plate, due to the connecting rod being dropped when there is no lock in the gun.

11. State that axis and all other pins should be inspected for service---ability.

EXAMINING AND ADJUSTING THE TRIPOD

12. Tell the squad that there are many places where slight play may occur. Although the play in each part may be slight, the accumulated effect may cause serious unsteadiness in the gun. This can usually be seen in DP tripods.

There are two types of play :-

a. Vertical play - This is usually found in the elevating geat. Demonstrate how this is taken up by loosening the jamming bolt, screwing in the tumbler nut and retightenin the jamming bolt. After making the adjustment, test to see if the play has been taken up.

b. Lateral play - This is normally due to the jaws of the cross-head having opened out, and it is the armourer's job to ad-just.

13. Practise the squad in adjusting the elevating gear.

14. Point out the following further points for examination :-

a. Clutch plates free from grit.

b. Jamming handles not bent.

c. Chains correct.

d. Feathers on joint pins.

SUM UP

Sum up the main points.

/Conclusion .....

CONCLUSION

1. Questions from the squad.

2. Questions to the squad on examining the feedblock sliding shutter and tripod.

3. Further practice if necessary in packing the barrel.

/LESSON 51 .....

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LESSON 51

PREPARATION FOR FIRING

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, spare parts case and box, cleaning rod, condenser can and tube, flannelette and cleaning material.

PERIODS

One period.

PREPARATION

Gun and tripod mounted with the other stores ready to hand.

POINTS TO BE CONSIDERED DURING LESSON

This lesson must be given just before the practical firing.

AIM

1. To teach the method of preparing the gun for firing.

2. To teach the special measures required before using the gun in very cold weather, in sandy countries or before landing operations.

B CONDUCT OF LESSON

PREPARING THE GUN FOR FIRING

1. Have the gun stripped down and all parts cleaned and examined by the squad.

2. See that the following parts are now oiled :-

Outside of the barrel.
Recoiling portions including the face of the lock.
Ramps.
Trigger bar.

3. Detail one of the squad to check the oil in the traversing handles and in the can in the spare parts case.

4. Have the gun reassembled and order the following parts to be dried :-

Inside of the barrel. /Muzzle cup .....

Muzzle cup
Muzzle attachment.
Blast Deflector.

5. See that the muzzle cup and front cone are screwed tight. Unless these are secure they may work loose during firing and cause an accident.

6. Have the gun levelled and the barrel casing filled with water. See that the condenser tube is undamaged and test the fitting of it to the gun. Order a man to fill the condenser can two thirds full of water.

7. Detail men of the squad to weigh:-

Fusee spring.
Recoiling portions.
Lock spring.

8. Have the contents of the spare parts box and case checked.

9. Order the squad to pack the cannelure of the spare barrel and to examine the tripod.

10. All sealed liners must be inspected for corrosion of the soldering. Any liners corroded should not be used.

11. Finally, state that the barrel should now be gauged with the .306-inch gauge plug.

ACTION IN COLD WEATHER

12. State that the following action will be taken to prepare the gun in cold weather :-

a. Lubrication, including packings, will be carried out with the following oils :-

Above 40 degrees F, Oil OX-52 or OX-13.
Zero degrees to 40 degrees F, Oil OX-13 or Grease LF-380.

(In emergency, kerosene burning may be used in lieu of kerosene vapourising).

At temperature of 40 degrees F and below, particular attension will be paid to the following points :-

i. Mechanism will be stripped, wiped clean and lubricated with oils as above.

/ii. Ensure .....

ii. Ensure that firing pins are free in their housings, as the firing pins may freeze up, although other parts of the mechanism work freely.

iii. Elevating gears will be thoroughly rinsed with gasoline, allowed to dry and then lubricated with oils as above.

b. The weight of the recoiling portions will be kept as low as possible, ie, between 2 lb and 3 lb and the fusee spring will be adjusted to not more than 7 lb at the start of firing. The recoiling portions will be worked by hand at frequent intervals.

c. Straw, sacking or blankets should be wrapped around the barrel casing. When hard frosts are expected barrel casings will be emptied and refilled with water diluted with 30 per cent glycerine, glycerine residue or glycol.

When it is necessary for the solution to be "topped up" water only will be added when glycerine or glycerine residue has been used, as these do not boil away; this is not the case with glycol.

Care will be taken not to exceed the 30 per cent solution glycol as a stronger solution gives off harmful fumes.

In temperatures from zero to - 40 degrees F a solution of 50 per cent glycerine or glycerine residue will be used. Glycol will not be used in these temperatures.

ACTION IN SANDY COUNTRIES

13. State that only a small quantity of oil will be used. Working parts will be wiped over with a slightly oily rag, which will prevent rust through the night and will give sufficient lubrication for working the gun during firing.

ACTION BEFORE LANDING OPERATIONS

14. State that all equipments which are to be involved in landing operations will be smeared with Grease LG-380 or in an emergency Grease LG-280 thinly applied. Equipment which will be needed for immediate use will be smeared on the outside only. The internal working parts will be lubricated as in pare 20 (a) above. The earliest opportunity will be taken of wiping dry and re-oiling.

SUM UP

Sum up the main points.

CONCLUSION Questions to and from the class. /LESSON 52 .....

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LESSON 52

POINTS DURING FIRING

A INSTRUCTOR'S NOTES

STORES

Gun, condenser can and tube, tripod, spare parts box and case and ammunition liners.

PERIODS.

One period.

PREPARATION

Guns must be in action and ready to fire.

POINTS TO BE CONSIDERED DURING LESSON

This lesson must be taught while doing live firing.

AIM

To teach the soldier the points to which attention should be paid during firing to ensure that the gun will maintain a high rate of sustained fire.

B CONDUCT OF LESSON

POINTS DURING FIRE

1. State that the supply of water must always be kept in mind. As soon as the water begins to boil and so long as it continues to boil, about $1\frac{1}{2}$ pints will be lost for every two belts fired.

2. Explain that the No 2 must ensure that :-

   a. The belt is in line with the feedblock.

   b. The belt has free movement.

   c. The cardboard packing strips are not removed from the belt before firing.

   Unless these points are attended to, stoppages will result.

/3. State .....

3. State that all repairs must be carried out immediately. To replace any part of the lock, the ordinary sequence for stripping the lock is followed until the broken part is reached. The only exeption to this is in the case of a broken lock spring when the parts fall clear. In such a case, a new lock spring may be inserted without stripping the lock.

4. Point out that the following duties should be carried out during a lull in firing :-

a. The bearing parts of the barrel, the recoiling portions, the ramps and the trigger bar should be oiled.

b. The tightness of the front cone, muzzle cup and jamming handles should be checked.

c. It should be made sure that the end of the condenser tube is below the level of the water in the condenser can.

5. Practise the squad as necessary.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 53.....

LESSON 53

POINTS AFTER FIRING

A INSTRUCTORS NOTES

STORES

1. Gun, tripod, condenser can and tube, spare parts case and box, cleaning rod, flannelette and cleaning material.

PERIODS

One period.

PREPARATION

On range just finish firing.

POINTS TO BE CONSIDERED DURING LESSON

The instructor can best teach this lesson by telling the squad what points require to be carried out stage by stage and by supervising their work.

INTRODUCTION TO LESSON

Tell the squad that there are certain points which must be carried out immediately after firing on the range and other points which must be dealt with later, on return to barracks.

AIM

To teach the soldier the points that must be carried out after firing.

B CONDUCT OF LESSON

ON THE RANGE

1. The following points must be carried out on the range :-

   a. The gun is unloaded and the lock, blast defelctor, muzzle attachment and muzzle cup removed, and the front cone loosened.

   b. Superficial fouling is removed from the barrel with the cleaning rod and oiled flannelette, followed by dry flannelette. The barrel is then re-oiled.

/c. The lock .....

c. The lock, blast defelctor, muzzle attachment and cup are oiled.

d. Finally, the gun is re-assembled. It may be of assistance in cleaning the barrel on return to barracks if the warm water is left in the barrel casing.

ON RETURN TO BARRACKS

2. The following points must be carried out on return to barracks :

a. The gun is stripped and all parts thoroughly cleaned.

b. The tension of the fusee spring is reduced.

c. i. Clean bore with oily or water-soaked flannelette.

ii. Dry and clean with dry flannelette.

iii. Re-oil.

iv. Repeat this procedure for at least three days after firing. This is important.

d. In order to prevent the formation of rust due to condensation of moisture on the outside of the barrel, the barrel casing should be emptied and the screws and cork plugs removed to allow a free circulation of air through the casing.

If the gun is likely to be left unused for any length of time, the packing should be removed from the cannelure and from the packing gland.

e. The tripod and spare parts should be overhauled and cleaned.

SUM UP

Sum up the main points and discuss any faults.

CONCLUSION

1. Questions from the class.

2. Inspect the gun and equipment.

/CHAPTER 9.....

CHAPTER 9

INSTRUMENTS

LESSON 54

DIAL SIGHT

A INSTRUCTOR'S NOTES

STORES

Gun and tripod, wall diagram of the dial sight and as many sights as possible.

PERIODS

One period.

PREPARATION

Give out dial sights.

INTRODUCTION TO LESSON

1. Tell the squad that the dial sight is an instrument which is used to obtain an elevation in indirect fire or whenever the target cannot be seen from the gun position.

2. The class should have dial sights in their hands and follow the description and actions of the instructor.

AIM

To explain the parts of the dial sight and their working to the soldier.

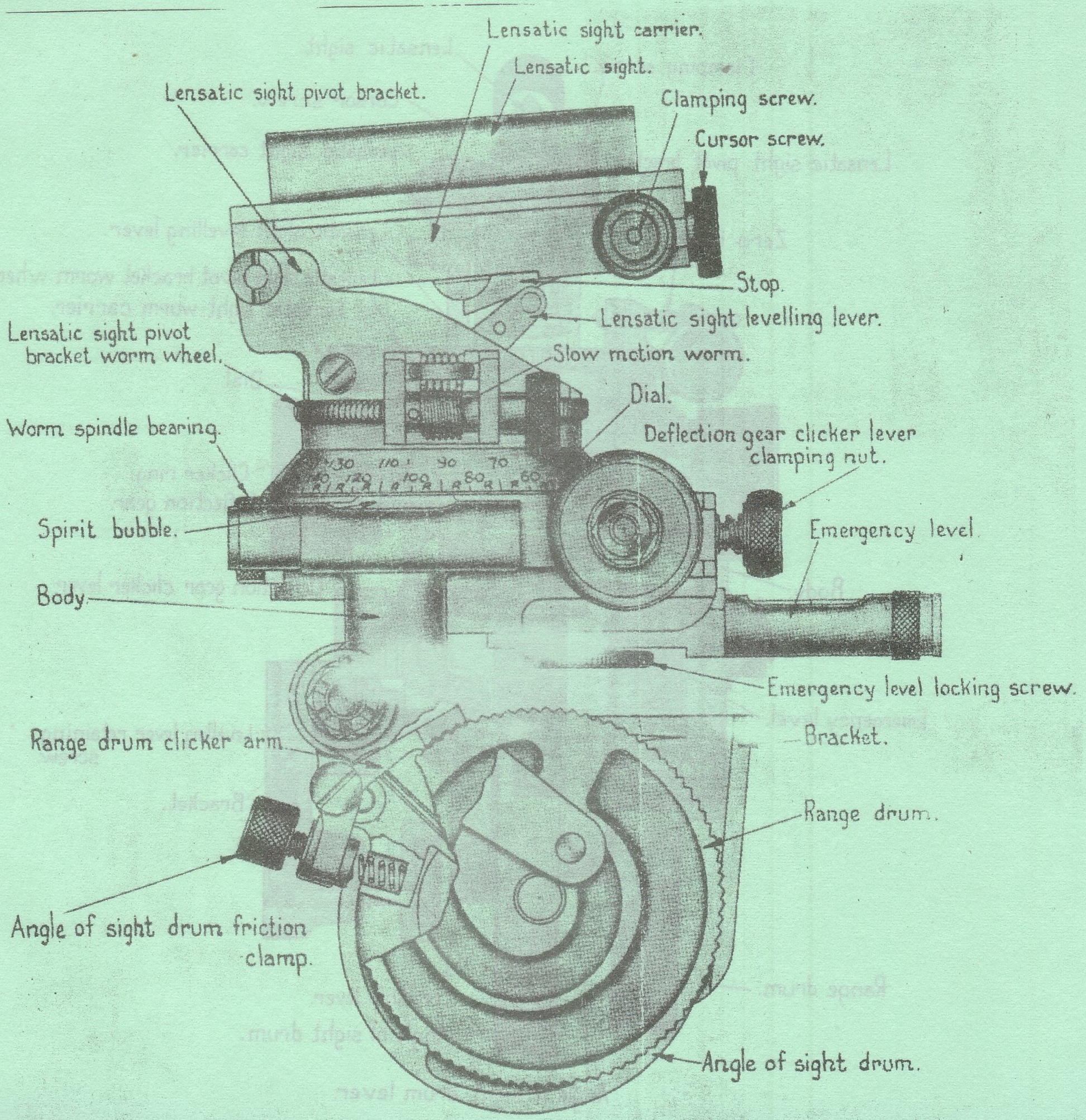
B CONDUCT OF LESSON

METHOD OF FIXING TO THE GUN

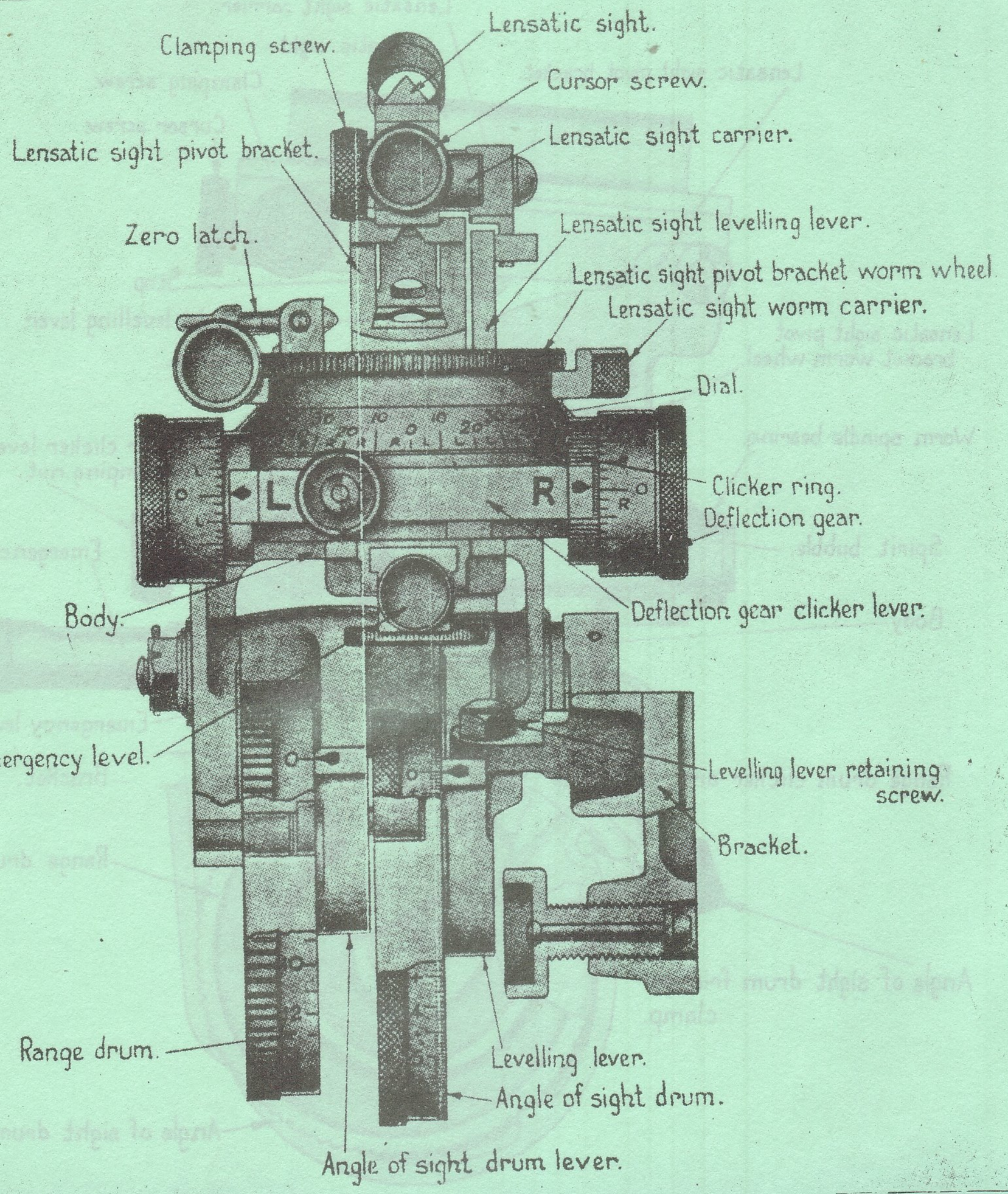
1. Demonstrate that the tapered bracket on the sight fits into the slot on the bracket on the gun. The sight is clamped thight by the fixing screw.

ELEVATION

2. State that elevation is placed on the dial sight by means of the range and angle sight drums used in conjunction with the level bubble. Describe these drums. The main features to note are :-' /a. The .....


Lensatic sight carrier.
Lensatic sight.
Lensatic sight pivot bracket.
Clamping screw.
Cursor screw.
Stop.
Lensatic sight levelling lever.
Lensatic sight pivot bracket worm wheel.
Slow motion worm.
Dial.
Worm spindle bearing.
Deflection gear clicker lever clamping nut.
Spirit bubble.
Emergency level.
Body.
Emergency level locking screw.
Range drum clicker arm.
Bracket.
Range drum.
Angle of sight drum friction clamp.
Angle of sight drum.

DIAL SIGHT


Clamping screw.
Lensatic sight.
Cursor screw.
Lensatic sight carrier.
Lensatic sight pivot bracket.
Zero latch.
Lensatic sight levelling lever.
Lensatic sight pivot bracket worm wheel
Lensatic sight worm carrier.
Dial.
Clicker ring.
Deflection gear.
Body.
Deflection gear clicker lever.
Emergency level.
Levelling lever retaining screw.
Bracket.
Range drum.
Levelling lever.
Angle of sight drum.
Angle of sight drum lever.

a. The range drum is graduated in 100s of yards up to 4,500yards. Up to 400 yards one click represents 100 yards - over 400 yards one click represents 50 yards. Forward of the drum is a quick release lever which disconnects the clicker ring. This quick release should always be used when initially setting the range drum, to avoid wear.

b. The angle of sight drum is graduated in 5s of minutes to 10 degrees of elevation and depression. The drum is fitted with a friction clamp.

c. The fitting for a spare level bubble.

3. Practise the squad in setting the drums.

DIRECTION

4. Tell the squad that direction is placed on the sight by the dial and deflection drums. The main features to describe are :

a. The dial is marked in 10s of degrees from 0 to 180 degrees left and right. These is a quick release stud forward of the dial.

b. The right and left deflection drums are marked in 10s of minutes from zero to ten degrees.

c. The fitting for a spare level bubble.

3. Practise the squad in setting the drums.

DIRECTION

4. Tell the squad that direction is placed on the sight by the dial and deflection drums. The main features to describe are :-

a. The dial is marked in 10s of degrees from 0 to 180 degrees left and right. There is a quick release stud forward of the dial.

b. The righ and left deflection drums are marked in 10s of minutes from zero to ten degrees.

c. The adjustable clicker lever and its arrows and how the lever controls the freewheeling and clicking of the deflection drums.

5. Practise the squad in setting the dial and deflection drums, and then replacing them at zero, by first putting the deflection drums at zero and then the dial.

/LENSATIC .....

LENSATIC SIGHT

6. State that the lensatic sight enables the No 1 to lay an aim on a mark without altering the setting of the deflection drums or elevating drums. It is principally used for maintaining direction.

7. Describe the following points regarding the lensatic sight :-

   a. Point out the tube may contain either a white triangle or a vertical white line.

   b. How the lensatic sight is adjusted vertically by the lensatic sight adjusting screw (Marked cursor screw on Plate

   c. How to zero the lensatic sight by means of the zero latch and how to free wheel it by means of the quick release.

   d. The operation of the fine adjustment worm.

8. Practise the squad in releasing and zeroing the lensatic sight.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

LESSON 55

AIMING POST, AIMING LAMP, ZERO POST AND DIRECTION DIAL

A INSTRUCTOR'S NOTES

STORES

Aiming post, aiming lamp, zero post, gun and tripod.

PERIODS

One period.

PREPARATION

All stores packed out on table.

AIM

1. To familiarize the soldier with the instruments named above.
2. To teach the method of setting up the aiming post and lamp.
3. To teach the setting of the direction dial.

B CONDUCT OF LESSON

AIMING POST

1. Describe the aiming post pointing out the adjustable arm, aiming mark, bracket for lamp and the supporting extension.

2. Demonstrate how to erect the aiming post vertically and lying on its side.

3. Practise the squad.

AIMING LAMP

4. Describe the components of the lamp. Point out the coloured dosc for toning down the light.

5. Show how to attach the lamp to the aiming post. The lamp is removed from the box and the cable passed through the slot in the side of the box. The lamp is secured to the extension above the aiming mark, with the bracket uppermost, by tightening the wing nut. The box is then

/closed .....

closed and placed to the aiming post with the ring facing the guns.

6. Demonstrate how to secure the box. On soft ground, the hook is released from its securing strap and stamped into the ground. On hard ground, the securing chain is used to anchor the box to a post or other firm object, but never to the aiming post.

7. Show how the reel is removed from the box and the swivel hook clipped through the swithc ring. Demonstrate how to switched the light on and off by pulling on the line.

8. Practise the squad.

ZERO POST

9. Show the zero post to the squad and tell them that it is used in obtaining direction in indirect fire.

DIRECTION DIAL

10. Point out that the direction dial is graduated from 0 to 180 degrees right and left. Show how the scale can be rotated round the socket and can be fixed in any position by a clamping screw. Indicate the pointer to the squad.

11. State that the direction dial is used as a check in maintaining direction. No 2 is responsible for setting it.

12. Practise the squad in setting the direction dial.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 56 .....

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LESSON 56

AIMING WITH THE DIAL SIGHT

A INSTRUCTOR'S NOTES

STORES

Two guns, tripods and dial sights, aiming post, aiming lamp two zero posts, a direction peg and landscape or natural targets.

PERIODS

One period.

PREPARATION

The two guns should be mounted about 15 yards apart, with dial sights attached and all drums and dials at zero. The aiming post should be placed centrally between and 15 yards from the guns.

AIM

To teach the soldier to lay an aim with the dial sight by day.

B CONDUCT OF LESSON

AIMING BY DAY

1. Explain how to aim with the lensatic sight containing a triangle. The eye should be about three inches from the sight. By moving the head backwards or forwards, the white triangle can be made to fit the tube exactly. The tip of the triangle can now be aligned on the aiming mark.

2. Explain how to aim with the lensatic sight containing a line. The eye should be about three inches from the sight. By moving the head backwards of forwards, the vertical line can be made to touch the top and bottom of the tube, an should be down the centre. The line can now be aligned on the aiming mark.

3. Demonstrate aims laid on the following types of aiming marks and practise the squad in each case :-

   a. Two zero posts, by having the sight set at zero, and moving the gun and tripod, until the lensatic sight and two posts are in line.

   b. The aiming post, by freewheeling the lensatic sight until it is

/aimed.....

aimed at the white disc.

c. . The aiming lamp, when fitted on the aiming post, by freewheeling the lensactic sight until it is aimed at the black aiming mark.

d. The zero post, direction peg and lamp, by having the sight set at zero, and moving the gun and tripod, until the sight, the zero post and lamp, which held immediately behind the direction peg, are in line.

e. The lensatic sight of another gun, by having a switch of about 90 degrees on the sight and tapping the gun until the lensatic sights are aimed at each other.

f. Landscape or natural targets, by freewheeling the lensatic sight until it is aimed at the natural target.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the squad.

2. Further practice if necessary.

/LESSON 57.....

LESSON 57

AIMING WITH THE DIAL SIGHT BY NIGHT

A INSTRUCTOR'S NOTES

STORES

Gun tripod, dial sight, aiming post, aiming lamp, zero post, direction peg, and lamp, electric.

PERIODS

One period.

PREPARATION

The gun should be mounted and the dial sight attached with all drums and dials at zero. The aiming post should be placed out. The zero post and direction peg should be lined up ready for use, and the aiming lamp held behind the peg when required.

GROUND

This lesson is best conducted in a dark room or shed which can be illuminated when necessary to show faults. The room must have a floor suitable for planting the zero post and direction peg can be planted into fire buckets. If such room is available, then the lesson must be taught outdoors by night.

AIM

To teach the soldier to lay an aim with the dial sight by night.

B CONDUCT OF LESSON

AIMING BY NIGHT

1. Explain that the method of aiming with the dial is the same by day, except that it may be necessary to assist the No 1 by shining a torch at an angel into the front of the lensatic sight.

2. Demonstrate and practise the squad laying an aim on :-

   a. Zero post, direction peg and aiming lamp.

   b. Aiming lamp, when attached to the aiming post.

/SUM UP .....

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the squad.

2. Further practice at aiming at night is essential.

LESSON 58

ELEVATION WITH THE DIAL SIGHT

A INSTRUCTOR'S NOTES

STORES

Gun, tripod, dial sight and aiming post.

PERIODS

One period.

PREPARATION

The gun mounted with the dial sight attached and all drums and dials at zero. The aiming post should be put out and the lensatic sight laid on to it.

INTRODUCTION TO LESSON

It is assumed that the gun is now laid for direction.

AIM

To teach the soldier to place elevation on the gun by means of the dial sight.

B CONDUCT OF LESSON

ELEVATION

1. Tell the squad that orders in range will be given to the nearest 50 yards and orders in angle of sight to the nearest 5 minutes , eg "All one nine fifity, plus two five minutes." "All one eight hundred, minus one five minutes."

2. Demonstrate that, on a range and angle of sight being ordered, the No 1 will place them on the elevating drums, tighten the angle of sight drum clamping screw and level the buble by means of the handwheel. Stress that when levelling the bubble, the No 1 will retain his holding with his left hand. Finally, the lensatic sight will be readjusted for elevation on to the aiming post.

3. Practise the squad.

Action on order "Stop."

/4. Explain .....

4. Explain and demonstrate that on the order "Stop" or when checking for elevation during firing the No 1 will first tap the gun until direction is obtained on the aiming post and then check and if necessary correct :-

a. Elevation drums.

b. Level of the bubble.

c. Alignment of the lensatic sight.

in that order.

5. Practise the squad.

SUM UP

Sum up main points. Emphasize that accuracy with the dial sight is essential if the guns are to hit the target in indirect fire.

CONCLUSION

1. Questions form the squad.

2. Further practice in elevation and direction with the dial sight.

/LESSON 59 .....

LESSON 59

RECORDING THE QUADRANT ELEVATION AND MEASURING AN ANGLE OF SIGHT

A INSTRUCTOR'S NOTES

STORES

Gun and tripod, dial sight and landscape or natural targets.

PERIODS

One period.

PREPARATION

Gun mounted with the other stores to hand.

AIM

1. To teach the soldier to record the quadrant elevation of the gun.

2. To teach the soldier how to measure an angle of sight with the dial sight.

B CONDUCT OF LESSON

RECORDING

1. Explain that the fire controller will order dial sight range after ordering "Record QE". This is necessary because the dial sight drum is graduated for use with MARK VIII Z ammunition.

2. Lay the gun on a target with a suitable range on the tangent sight. Demonstrate that, when he is ordered to record the QE, the No 1 will first check his aim. He will then attach the dial sight, place on the range drum the dial sight range ordered to the range drum and level the bubble by means of the angle of sight drum, and tighten the clamping screw. The two drums will now record the quadrant elevation required to hit the target.

3. Practise the squad in recording the QE.

MEASURING AN ANGLE OF SIGHT

4. Tell the squad that in an indirect position, the section commander may order the No 1 to measure the angle of sight to the crest. The

/section .....

section commander requires this in order to ascertain if the guns will clear the crest.

5. Demonstrate that the No 1 will place the dial sight on the gun and, with the tangent sight at zero, lay the gun by direct means on the point indicated. Then, with the range drum at zero, the No 1 will level the bubble by means of the angle of sight drum and report the reading which is the angle of sight to the object.

6. Practise the squad in measuring angles of sight.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the squad.

2. Further practice as required.

/LESSON 60 .....

LESSON 60

OBSTRUCTION OF THE TARGET

A INSTRUCTOR'S NOTES

STORES

Section drill stores, ie, one vehicle complete with guns, tripods condensor cans and tubes, dial sights, spare parts cases, six liners per gun, spare parts box, aiming post, belts with drill cartridges, two gun flags. If no natural landscape available, landscape targets can be used, preferably one for each gun.

PERIODS

One period.

PREPARATION

The vehicle will be drawn up. The spare parts box will be laid out in between the two guns. Gun stores should be loaded on the vehicle, and the gun flags planted about 15 yards apart, 15 yards in front of the vehicle. If wet groundsheets should be placed just in front of the gun flags.

B CONDUCT OF LESSON

AIM

1. To teach the section the arrangements necessary to enable it to continue engaging a target which is likely to become obscured.

2. Safety precautions.

3. Detail two gun teams and drivers, and a section Commander's driver Order "Fall in" and "Action". Engage a target Order, "Rest" and order the drivers to join the spectators.

REVISION

4. Revise lesson 59 by questions and answers.

APPROACH

/5. Give .....

5. Give the aim of the lesson (see para 1 above). Tell the squad that there are two drills required, one when the obscuration is likely to be of short duration (eg, temporary smoke screen), and one when the obscuration is likely to last some time (eg, fog rising or prolonged artillery concentration on the target).

TEMPORARY OBSCURATION

6. State that, when the target is likely to be obscured for a short time, the section commander will order "Stop" and "Pick up aiming mark" "Dial sight ranges."

7. Explain that on that order the No 1 will :-

   a. Re-lay on the target.

   b. Lower the tangent sight.

   c. Record the QE with the Mark VIII Z range ordered by section commander.

   d. Pick up an aiming mark with the lensatic sight. Any clearly defined object at a short range from the gun will do.

8. Order "Position" "Fire" and practise the No 1.

9. Explain that the No 2 will :-

   a. Set the tripod dial at zero.

   b. Note the aiming mark.

   c. Note the reading on the angle of sight drum.

10. Practise the No 2.

11. Explain that when the target can again be seen, the section commander will order "Stop" "Remove dial sights". The No 1 will do as ordered, and the section commander will then give the necessary orders to continue firing by direct means.

12. Practise the squad in temporary obscuration.

PROLONGED OBSCURATION

13. State that when the target is likely to be obscured for a long time and provided sufficient warning is obtained, the section commander will order :-

/"Stop" .....

"Stop," "Unload," "Clear gun," "Out aiming post."

14. Explain that on the order "Out aiming post" dial sight range."

a. The No 1 will close the rear cover, place on the dial sight record the QE with the Mark VIII Z range ordered by Sec Comd, and align the lensatic sight on the aiming post.

b. The No 2 will set the tripod dial at zero and note the angle of sight.

c. The No 3 of the odd sub-section will put out the aiming post centrally about 15 yards in front of the guns.

15. Order "Go-on" and then "Stop," "Unload," "Clear guns," "Out aiming post" "dial sight range". When the Nos 1 have aligned their lensatic sights order "Load" and "Go-on".

16. Explain that when the target can again be seen, the No 1 will act on the section commander's orders as in para 11. When the aiming post is in use it will be left out in front of the guns until "Cease firing" is ordered, when "Clear gun" will be ordered before "Cease firing."

17. Order "Stop" - "Remove dial sights."

18. Explain that if the target has width, after the order "Stop" has been give the fire controller will order "Quarter way in lay" and the No 1 will lay the guns a quarter way in from their respective ends of the target. The fire controller will order either "Pick up aiming mark" or "Out aiming post" dial sight range, and the drill, at the guns as in paras 7, 9 and 14. The number of taps to be employed will then be ordered, followed by "Go on". When the target can again be seen the drill applies as in paras 11 and 16

SUM UP

Main points of lesson.

CONCLUSION

Questions to and from squad.

LESSON 61

CHANGING FROM DIRECT FIRE TO NIGHT FIRING AND VICE VERSA

A INSTRUCTOR'S NOTES

STORES

One vehicle complete with section drill stores, aiming lamp and three hand lamps.

PERIODS

One period.

PREPARATION

Stores and vehicle laid out for section drill. Aiming lamp and hand lamps with the stores representing the section commander's carrier.

INTRODUCTION TO LESSON

Detail a section and get into action. State that it will soon be getting dark and that the section is required to engage a target during the night.

AIM

1. To teach the section the preparations required to enable the guns to continue engaging a target by night.

2. To teach the section how to change back to direct fire at daylight.

B CONDUCT OF LESSON

CHANGING TO NIGHT FIRING

1. State that the section commander will lay the guns on the target and send back no 3 of the odd sub-section to bring up the night firing stores. Send the no 3 to fetch the aiming lamp and three hand lamps.

2. Tell the squad that the section commander will then order "Prepare for night firing" "dial sight range 2

Explain that on that order, the No 1 will lower the tangent sight and record the QE with MARK VIII Z range ordered by Sec Comd. The No 2

/will .....

will zero the tripod dial. The no 3 of the odd sub-section will hand one lamp to the section commander and one to the other No 3. Both No 3 will then take post on the left of their guns, ready to assist their No 1.

3. Order "Prepare for night firing" "dial sight range ....."

4. Order "Unload," "Clear gun."

5. Explain that the section commander will order "Out aiming lamp" and on that order :-

a. Nos 1 will close the rear cover.

b. No 3 of the odd sub-section will put out the aimping post place on the lamp, secure the box, attach the line to the switch and bring the reel back to the section commander.

c. Nos 1 will then align their lensatic sights on the aiming lamps.

6. Order "Out aiming lamp".

7. Tell the squad that the gun are now laid on the target by night and that, at the appropriate time, the section commander will order "Load" and "Fire".

RETURN TO DIRECT FIRE

8. Explain that when day breaks the section commander will order "Prepare for direct fire, "Unload," "Clear guns," "Remove dial sights," "In aiming lamp".

The No 1 will unload, clear guns and zero and remove dial sights. The No 3 of the odd sub-section will bring in the aiming lamp and box, re-wind the line and replace it in the box, and collect the hand lamps. When an opportunity arises, he will return the night firing stores to the carrier.

9. Practise the squad in changing over to night firing and back to direct fire.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/LESSON 62 .....

LESSON 62

RELIEF OF GUNS BY NIGHT

A INSTRUCTOR'S NOTES

STORES

Two guns, tripods, dial sights, condenser cans and tubes, aiming post and aiming lamp. Two hand lamps, eight liners and one set of night line pegs.

PERIODS

Two periods.

PREPARATION

One gun will be in position, dial attached and laid on its fixed line, lensatic sight adjusted on the aiming lamp, by means of the deflec tion drums. The other set of gun stores should be laid out a few yards in rear.

INTRODUCTION TO LESSON

Tell the squad that on occasion a section which is in action may be relieved by another section. Such relief will normally take place at night when guns are laid on fixed lines. The relief of each gun is carried out separately to ensure that one gun is always in action. The section commander will indicate which gun is to be relieved first, but the actual relief of the gun is the responsibility of the Nos 1 as the section commanders will be occupied in handing and taking over stores, information and orders.

State that, in this lesson, the relief of one gun only will be considered. The relief of the other gun would take exactly the same form.

AIM

To teach the method of relieving a section in action by night.

B CONDUCT OF LESSON

RELIEF OF GUNS

1. Detail a No 1, 2 and 3 for each gun. Explain, using the members of the squad.

/2. The No 1 .....

2. The No 1 of the outgoing gun will check to make sure he is on his fixed line. The angle on the deflection drums and the QE will be noted by the No 1 of the incoming gun, who will set his dial sight accordingly.

3. The No 3 of the outgoing gun will remove the ammunition and condenser can to a flank.

4. The No 1 of the outgoing gun will take off his dial sight and with the aid of the No 2, remove the gun and crosshead from the tripod, taking care not to disturb the tripod.

The No 1 then places a gun peg and collar under the tripod so that the cross on the collare coincides with the cross-wires at the bottom of the tripod. The no 3 will assist by shining a shaded lamp on the collar. If the tripod has no cross-wires, the ribs inside the socket must be used as a guide.

The No 1 of the outgoing gun will then remove his tripod without disturbing the gun peg and collar.

5. The No 1 of the incoming gun will remove the cross-head and mount the tripod accurately over the collar. He will then stamp in the legs and ensure that the crosswires coincide with the cross on the collar. He will replace the cross-head and tighten the traversing clamp. The Nos 2 and 3 will mount the gun and bring up the gun stores.

6. The No 1 of the incoming gun will put on his dial sight, checking that it registers the correct readings, and tap the gun until the lensatic sight is aligned on the aiming lamp. The gun is now laid for direction. When the bubble is levelled it will be laid for elevation. He will then half load and press the thumbpiece.

7. When both guns of the section are laid for elevation and direction, they will be unloaded and cleared, and the aiming lamp will be removed. Te relieving section will then put out its own aiming lamp. The Nos 1 will then align their lensatic sights on the aiming lamp using the deflection drums and taking care not to disturb the guns. The angle of switch and the QE will be noted on a piece of paper to be kept in the dial sight boxes.

8. Practise the squad in reliefs by night, one gun relieving the other. The instructor can test the accuracy of the relief by checking the laying of the gun with the tangent sight.

SUM UP

Sum up the main points.

/CONCLUSION .....

CONCLUSION

Questions to and from the squad.

/CHAPTER 10 .....

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CHAPTER 10

SECTION DRILLS

LESSON 63

THE THEORY PARRALLELING

A INSTRUCTOR'S NOTES

STORES

Blackboard.

PERIODS

Two periods.

PREPARATION

Draw the diagrams given in this lesson on the blackboard.

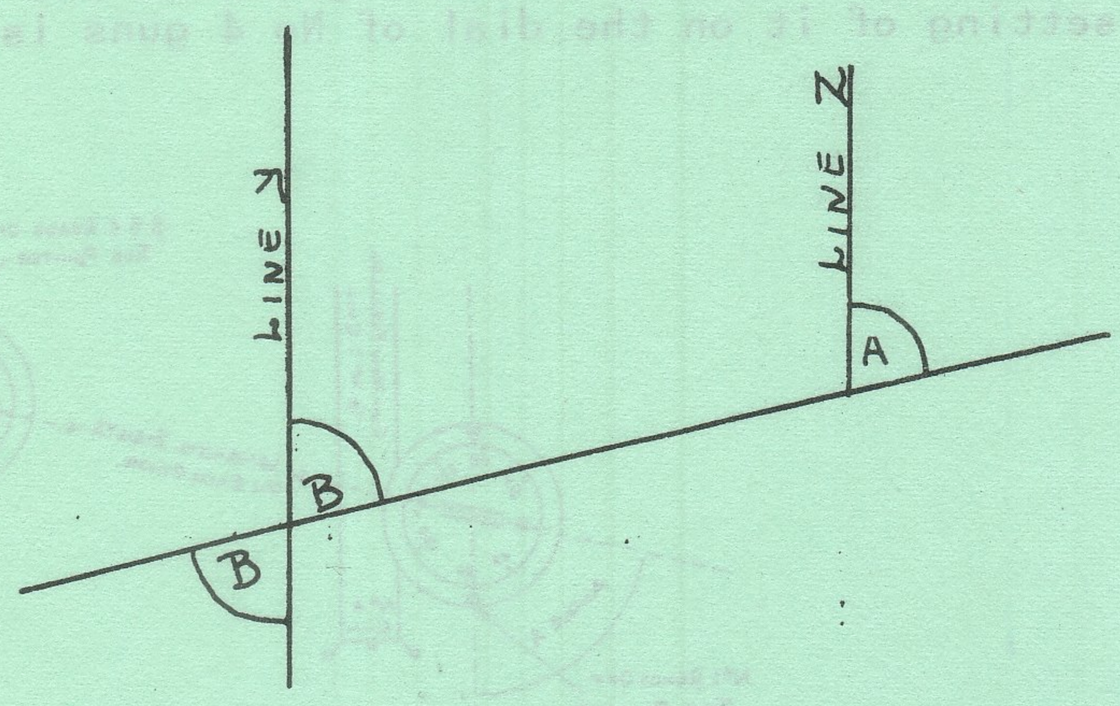
AIM

To teach the system of placing guns on parallel zero lines.

B CONDUCT OF LESSON

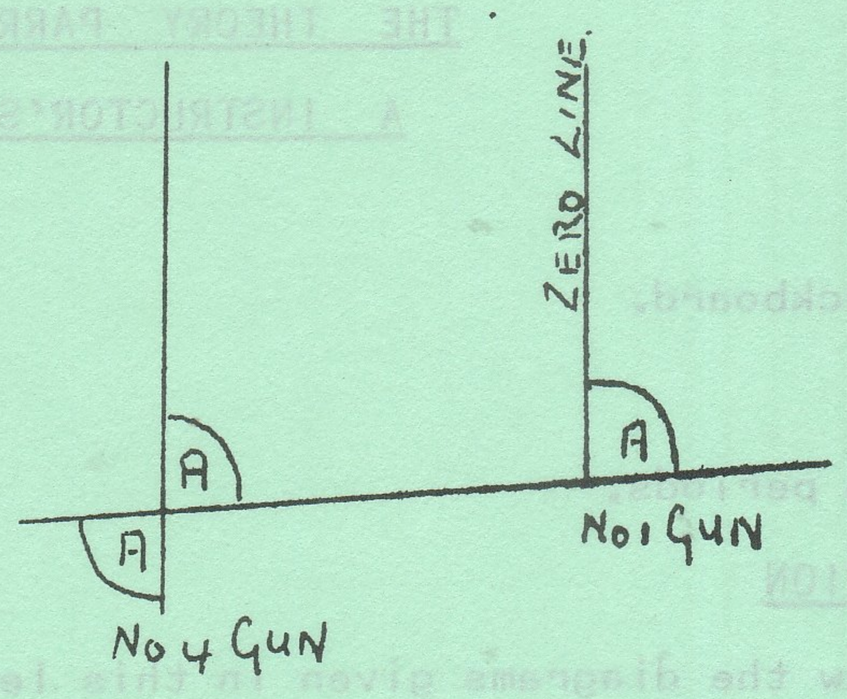
THEORY OF PARALLELING

1. Explain :-



/If the .....

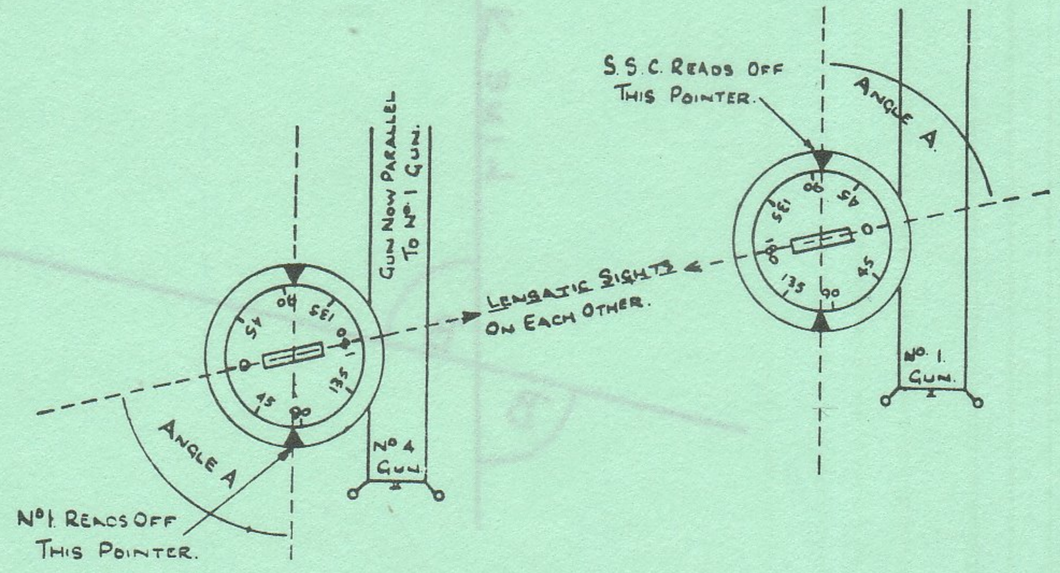
If the angles B can be made equal to the angle A, the line Y is automatically parallel to the line Z. This mathematical principle is applied in paralleling machine guns as follows :-



No 1 gun is laid with the dial sight on its zero line. The angle A is then measured and ordered to no 4 gun as "Left A degrees Left A degrees is set on the direction dial and drums of no 4 guns, making an angle of A degrees between the barrel of the gun and the lensatic sight.

The gun is then tapped until the lensatic sight is aligned on the dial sight of No 1 gun; No 4 gun is thus made parallel to No 1 gun.

The measuring of the angle A on the dial sight of No 1 gun and the setting of it on the dial of No 4 guns is shown below.



/The same .....

The same process is then repeated for the remaining guns. For the sake of convenience the order of paralleling is Nos 4,3, and 2 guns.

METHOD OF PARALLELING

2. State that based on the above theory, the sequence of paralleling is as follows :-

a. Align the zero posts on the zero line.

b. The guns are mounted with all dials and drums at zero and lensatic sights locked.

c. The lensatic sight of No 1 gun is aligned through the zero posts by moving the tropod or tapping the gun.

d. The senior section commander measures the angle to Nos 4,3, and 2 guns from the zero line, reading the angle from the front pointer. He then closes the angle to make sure that No 1 gun has not been distrubed whilst he has been measuring the angles from the other guns.

e. The angles are placed on the dial sights, reading off the REAR pointer. The guns are tapped until their lensatic sights are laid on the dial sight of No 1 gun.

f. To maintain direction lensatic sights are now unlocked and aligned on the aiming posts.

RULES OF PARALLELING

3. Emphasize that if the following rules are remembered and followed, there can be no errors in paralleling :-

a. Before paralleling begins, all dials and drums must be at zero and lensatic sights locked.

b. The senior section commander reads off the FRONT pointer on the dial, the nos 1 off the REAR.

c. When the guns have been paralleled, all drums and dials are again placed at zero.

d. Once guns are parallel, they must not be tapped until the lensatic sight has been unlocked and aligned on the aiming post.

/SUM UP .....

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 64 .....

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LESSON 64

PARALLELING WITH THE DIAL SIGHT^

A INSTRUCTOR'S NOTES

STORES

Two guns complete.

PERIODS

Two periods.

PREPARATION

Gun mounted about 15 yards apart with dial sights attached. The aiming post should be planted 15 yards in front and centrally between the two guns.

INTRODUCTION TO LESSON

Tell the squad that the right hand gun represents No 1 gun, the left hand gun No 2 gun, and that nos 3 and 4 guns would be to the left again.

AIM

To teach the soldier how to handle the dial sight when the guns are being paralleled.

B CONDUCT OF LESSON

ZERO LINES

1. Explain that on the order "Zero Lines," the No 1 will ensure that all deflection drums and dials are at zero.

PARELLELING

2. Describe and demonstrate the duties of No 1 and No 2 on the order "No 2 gun, Left 1 degree 20 minutes." The No 1 will set the dial and deflection drums as ordered. He will tap the gun, elevating or depressing the lensatic sight, until it is laid on the lensatic sight of No 1 gun. The No 1 of No 2 gun will then zero the deflection drum and dial again by pressing the quick release, adjust the lensatic sight until it is laid on the aiming post. The No 2 will then zero the direction dial.

/3. Practise .....

3. Practise the squad in the duties of No 1 and No 2.

ACTION ON THE ORDER "STOP"

4. State that on the order "Stop" or at any time when checking for direction, the gun will be tapped until direction is obtained on the aiming post.

5. Practise the squad.

SUM UP

Sum up the main points. Stress that, when once the guns are paralleled and the lensatic sight laid on the aiming post, the lensatic sight must never be moved for direction. To obtain direction, the gun must always be tapped.

CONCLUSION

1. Questions from the squad.

2. Further practise for backward men.

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LESSON 65

THE DIRECTOR NO. 9, MARK 1

A INSTRUCTOR'S NOTES

STORES

As many directors and stands as available.

PERIODS

One period.

INTRODUCTION TO LESSON

Tell the squad that the director is an instrument used in indirect fire for measuring verticaland lateral angles.

AIM

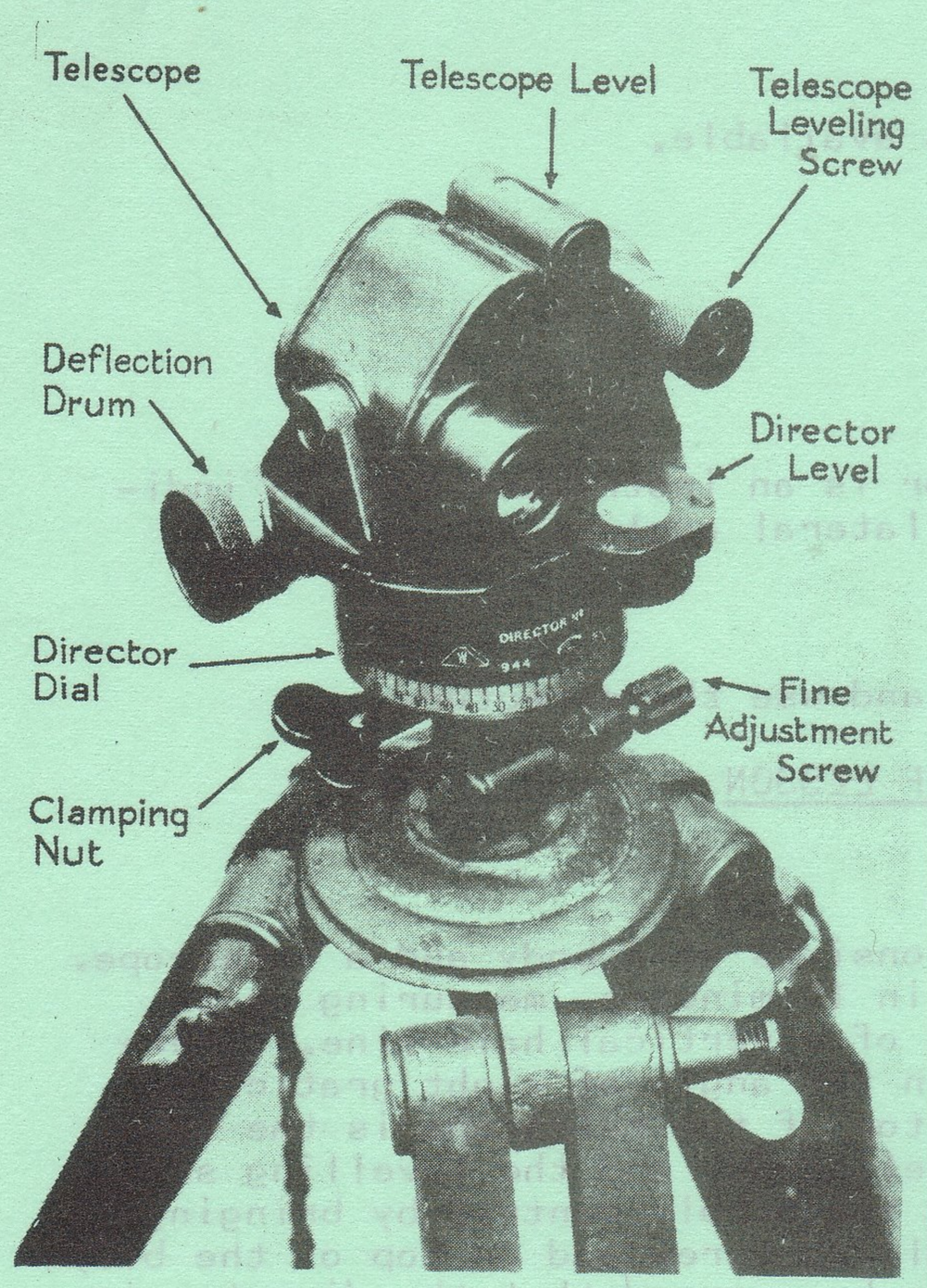
To teach the soldier to set up and use the director.

B CONDUCT OF LESSON

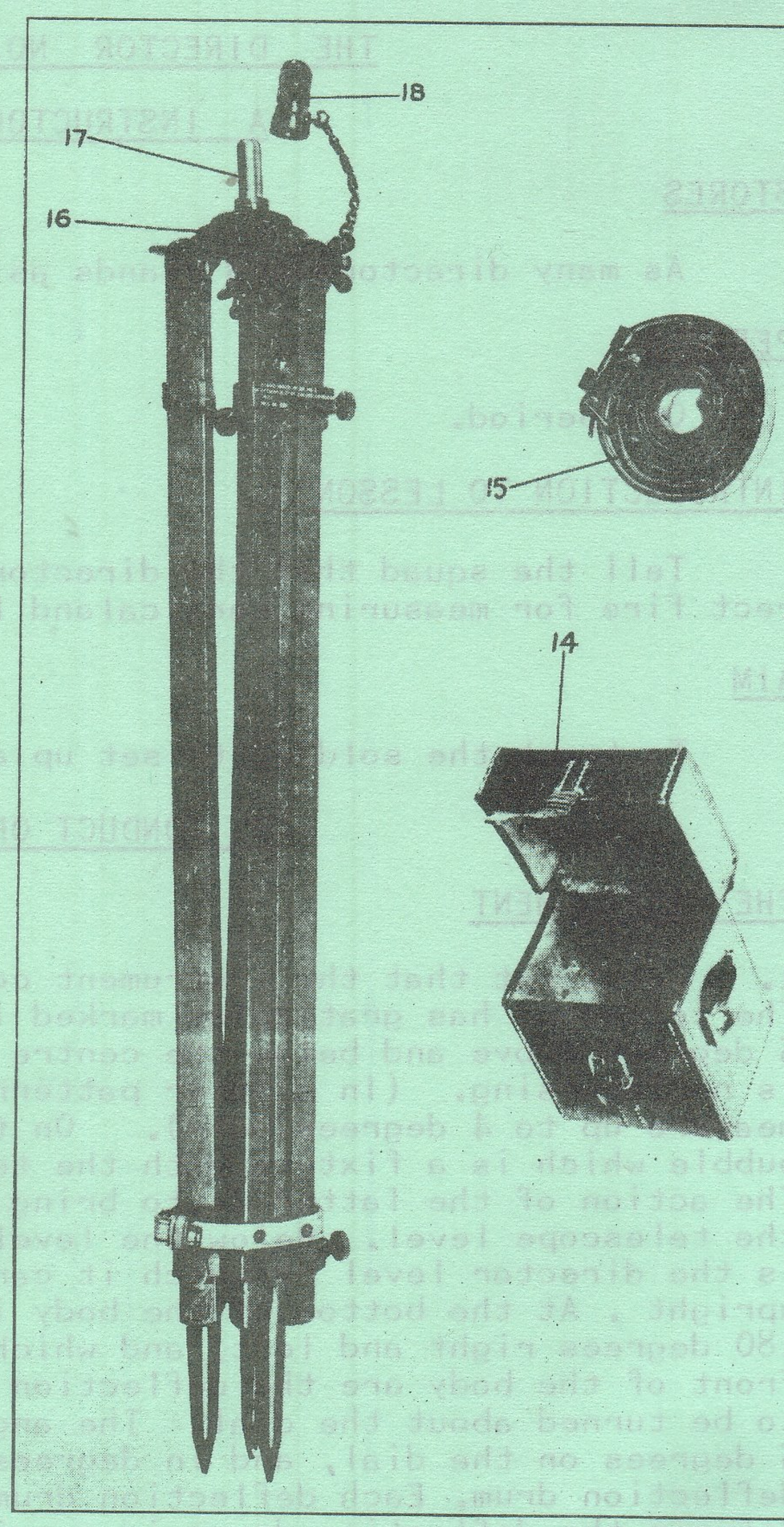
THE INSTRUMENT

1. Point out that the instrument consists of a body and a telescope. The telescope has graticules marked in 10 minutes, measuring up to 5 degrees above and below the centre of a vertical hair line. There is no focussing. (In a later pattern the angle of sight graticules measure up to 4 degrees only). On top of the telescope is the level bubble which is a fixture with the telescope, and the levelling screw. The action of the latter is to bring the bubble central by bringing the telescope level. Below the levelling screw and on top of the body is the director level by which it can be ensured that the director is upright . At the bottom of the body is the dial which measures 0 to 180 degrees right and left, and which is normally set at zero. In front of the body are the deflection drums which enable the director to be turned about the dial. The angle of deflection is measured to 5 degrees on the dial, and in degrees and minutes by the appropriate deflection drum. Each deflection drum and dial has its own pointer. Between the deflection drums is a quick release, which, by being depressed, enables the director to be turned about the dial without the use of the deflection drums. Below the body is a socket, by which the director is attached to a pivot on the stand. When attached, the director complete can be turned about the pivot, or clamped in the required position by means of the clamping nut. Without altering the settings on the direction dial and deflection drums fine adjustments in

/direction .....



Director No. 9



Stand Instrument No. 28, Mark I

14. Leather case.
15. Shoulder strap.
16. Base plate.
17. Ball joint.
18. Protecting cap.

direction can be made with the fine adjustment screw, below the right deflection drum. The two pointers alongside indicate when this is central, as it should be when the director is first set up.

2. Question the squad on the instrument.

THE STAND

3. Show that the legs are adjustable. Point out the pivot, the universal joint and its clamping screw. State that the protecting capmust always be screwed on when the director is not in use.

SETTING UP THE DIRECTOR

4. Demonstrate how to set up the director. Undo the strap holding the legs together. By loosening the milled headed screws extend the legs as necessary and tighten up the screws. Splay out the legs and mount the stand, with picot at conbenient height and approximately upright. If necessary tighten butterfly nuts. Press the legs firmly into the ground. Remove pivot protector and attach director. Ensure that fine adjustment screw is central. Loosen the universal joint clamping screw and centralize director level bubble. Tighten universal joint clamping screw. Hang the case over the stand.

5. Practise the squad insetting up their directors.

TO TAKE AN ANGLE OF SIGHT (NORMAL)

6. Explain and demonstrate that the telescope is aligned on to the target, and the clamping nut tightened. The bubble is then levelled. By looking through the telescope the angle of sight can be read from the graticules. Stress that readings must be to the nearest five minutes and that the bubbles must be central.

7. Practise the squad on various targets.

TO TAKE AN ANGLE OF SIGHT OF MORE THAN 5 DEGREES. (OR OF MORE THAN 4 DEGREES, ON THE LATER PATTERN DIRECTOR).

8. State that if the angle of sight is more than 5 degrees the director is laid at a convenient point above or below the target and the angle of sight to this point and the target is then measured with the graticules by means of the leveling screw. The sum of the two angles will give the angle of sight to the target.

9. Practise the squad.

/TO MEASURE .....

.

TO MEASURE A VERTICAL ANGLE

10. To measure the vertical angle between two objects. Using the levelling screw, put the zero graticule on one of the objects, and from the scale read the angular measurements to the second object.

11. Practise the squad.

TO MEASURE THE LATERAL ANGLE BETWEEN TWO POINTS.

12. Demonstrate that the dial and deflection drum are set at zero, and the fine adjustment pointers opposite each other. The clamping nut is loosened and the director laid approximately at the first point. The dial and drums should still be at zero. The clamping nut is now tightened and the hair line brought accurately on to the first point by means of the fine adjustment screw. Then using the deflection drums, the hairline is swung on to the second point. The angle can can now be read in degrees off the dial and in degrees off the appropriate deflection drum. Stress that readings must be as accurate as possible and that care must be taken not to read off the wrong deflection drum. State that before the director is returned to its case all drums must be at zero and the fine adjustment screw centralized.

13. Practise the squad in measuring switches.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the squad.

2. Further practise as required.

/LESSON 66.....

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LESSON 66

"MOUNT GUN" AND CEASE FIRING

A INSTRUCTOR'S NOTES

STORES

Two vehicles complete with drill stores, four gun flags, two megaphones and two spare parts boxes.

PERIODS

Two periods.

AIM

1. To teach the drill for coming into action in indirect fire, and cease firing.

B COUNDUCT OF LESSON

2. Safety Precautions.

APPROACH

3. Give the aim of the lesson (see para 1 above). Explain paras 1,2,4, 5 and 8 of the Introductory Notes.

"MOUNT GUN"

4. Detail four gun teams and order "Fall-in" and "Mount". Send the spectaros to one flank of the gun line.

5. Issue orders to section commanders. When the carriers arrive behind their flags, order the gun teams to remain still.

6. that when the vehicles arrive at the gun flags, the Nos 1 will dismount, sling the dial sight box over their right shoulders and double forward to their gun flags with the tripods. .They will mount the tripods over the gun flags and with the exception of no 1 of No 1 gun, stamp the legs in. When the guns are mounted, they will place on their dial sights.

7. Order the No1 to carry on.

8. Stat that the No 2 and 3 will act as in section drill. The Nos 3 of Nos 1 and 3 guns have the additional duty of planting the aiming posts centrally between 1 and 2 guns and 3 and 4 guns,

/9. Order.....

9. Order the Nos 2 and 3 to carry on.

10. Tell the squad that the drivers assist in off-loading the ammuni-- tion as in section drill. When their vehicles are unloaded they drive off to the vehicle position ordered.

11. Order the drivers to carry on.

Order "Stand clear" and fall in the squad in the centre of the gun line.

"CEASE FIRING"

12. Explain that when the senior section commander receives "Cease firing" from the group commander, he will acknowledge it. He will then signal the vehicle forward. The drivers will bring their carriers to a position in rear of their respective guns.

13. Detail fresh gun teams and order "Fall-in,""Take post" and "Load".

14. Signal "cease firing".

15. State that as the vehicles are on the way up, the senior section commander will order: "Unload," "Clear guns", "Remove dial sights".

The Nos 1 will act as in gun drill, reporting their guns clear in order. Tell the senior section commander to carry on.

16. Explain that as soon as the senior section commander sees that all dial-sights are in their boxes, he will order "Cease firing". All gun numbers will then act as in section drill. The Nos 3 will collect their aiming posts and the section commanders will collect the gun flags and zero posts.

17. Tell the senior section commander to order "cease firing".

18. Practise the squad in "Mount gun" and "Cease firing".

19. SUM UP

Sum up the main points.

CONCLUSION

20. Questions from the squad.

21. Further practise to increase speed.

/CHAPTER 11 .....

CHAPTER 11

PL . DRILL

INTRODUCTORY NOTES

ORGANIZATION

1. In indirect fire, the fire of four guns is required in order to engage targets effectively. Two of the machine gun sections of the machine gun platoon therefore work together as the machine gun group under an officer of NCO of the machine gun platoon who is referred to as the group commander.

CLASS AND INSTRUCTORS

2. In all indirect fire lessons, three instructors are required to teach and supervise the actions of the gun numbers. One will act as instructor and group commander. The other two will act as senior and junior section commanders and will also assist in supervising the work of the gun numbers.

3. The instructor should normally stand at least 30 yards in front of the guns. Both he and the senior section commander should use megaphones.

SENIOR AND JUNIOR SECTION COMMANDERS

4. Throughout this chapter, duties are alloted specifically to the senior and junior section commanders. The senior section commanders will be in charge of the gun line and is responsible for transmitting the orders of the group commander to the guns. The junior section commander will generally assist in supervising the gun line and transmit the signals of the senior section commander to the guns.

5., At the beginning of each drill, the section commanders will fall in in front of the centre of the gun line facing the instructor. The instructor will then give the following information to them :-

a. The direction in which the guns are to be mounted.

b. The number of liners to be off-loaded.

c. The vehicle position.

The section commander will then double to a position in the centre of the gun line and extend his right arm in the direction in which the guns are to point. The junior section commander will signal up

/the carriers. .....

the carriers. As they arrive, he will direct them to their respective gun flags and pass on the information in (b) and (c) above. He should not allow the carriers to halt while passing on this information.

6. When the guns are in action the section commanders will take post on the flanks of the gun line and kneel on one knee - senior section commander on the flank of No 1 gun, junior section commander on the flank of No 4 gun.

7. Section commanders will acknowledge all orders by raising their hands. If a repetition is required they will keep their hands raised. The senior section commander will repeat back all orders to the group commander. The gun numbers will act on the section commanders repeating back.

8. Before each drill, the gun line will be prepared as follows :-

a. Gun positions marked :-

No 1 gun .... Red flag
No 2 gun .... White flag
No 3 gun .... Red flag.
No 4 gun .... White flag.

These flags will be 15 yards apart laterally and will be stagered, No 1 gun will always be on the right. The spare parts boxes will be placed between each section's gun flags.

b. The four gun carriers to be used will be formed up about 100 yards to the flank and rear of the position.

c. A vehicle position will be selected in rear of the position.

PRACTICE

9. As proficiency is obtained, the drills should be practised making use of cover, Particular attention should be paid to avoid the exposure of personnel and vehicles on the crest line.

/LESSON 67 .....

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LESSON 67

PARRALLELING

STORES

Two vehicles complete with drill stores, four gun flags, two megaphones, spare parts boxes and two zero posts.

PERIODS

Two periods.

PREPARATION

See Introductory Notes. The two zero posts will be planted in line with No 1 gun flag.

INTRODUCTION TO LESSON

1. State that in indirect fire the lines of the four guns are made and kept parallel. The group commander can thus give one switch for the four guns instead of separate switches for each gun.

2. Detail four gun teams, order "Fall-in", and "Mount". Bring the guns into action and then fall out all except Nos 1 and 2 of No 1 gun.

AIM

To teach the drill of putting the guns on parallel lines for indirect fire.

B CONDUCT OF LESSON

PLACING NO 1 GUN ON ITS ZERO LINE

1. State that when the guns are mounted, Nos 1 will ensure that the dial and deflection drums of the dial sight are at zero and the lensatic sight locked.

2. Explain that directly No 1 guns is mounted, the No 1 and 2 will align the gun on the zero posts as in Lessons 38. They will then stamp in the tripod and recheck the line of sight. No 1 gun is now said to be on its zero line.

3. Practise the No 1 and 2 in aligning the lensatic sight on the zero posts.

/PARALLELING .....

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PARALLELING

4. Explain that the senior section commander will check that No 1 gun is correctly aligned and then lay the lensatic sight, by means of the deflection drums, on the lensatic sight of each gun in turn, starting with No 4 gun. The angles to each gun will be read from the front pointer of the dial sight and will be ordered to each gun in turn in the following manner. The senior section commander will order "Zero lines".:-

"No 4 left - degrees - minutes"
"No 3 left - degrees - minutes"
"No 2 left - degrees - minutes".

5. Order the gun teams to "Fall in" and "Take Post." The senior section commander will then measure and call out the angles. Tell the squad that when the angle for their gun is called out, the Nos 1 and 2 will act as in Lesson 40.

The junior section commander will acknowledge each angle in turn and move to each gun, checking and supervising the placing on of the switches.

CHECKING FOR PARALLELISM

6. Explain :-

When all the guns are laid, the junior section commander will check for parallelism. Beginning with No 1 gun; he will double down the gun line, kneeling behind each gun about 15 yards in rear and glancing along the barrel casing. He should then notice if any gun is not on parallel lines. Should any gun appear not to be parallel, he will report "No - gun not on parallel lines." If all guns are parallel he will take post on the flank of No 4 gun.

7. Tell the junior section commander to check for parallelism.

8. When the junior section commander has given out the anlge for NO 2 gun, he will return all drums and dials to zero and check that the line of sight of No 1 gun is still on the zero posts.

9. The No 1 of No 1 gun will unlock and adjust his lensatic sight onto the aiming post. No 2 will zero the tripod dial.

REPORTING ON ZERO LINES

10. State that the senior section commander will report "Guns on ze-/ro lines .....

ro lines" to group commander. On this order, No 3 of No 1 gun will double out and bring in the zero posts, placing them near No 1 gun.

11. Tell the senior section commander to report on zero lines.

12. Questions from the squad.

13. Order "Load," followed by "Cease firing".

14. Prepare the gun position again and practise coming into action and paralleling.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/CHAPTER 12 .....

CHAPTER 12

INDIRECT FIRE

INTRODUCTORY NOTES

1. The indirect fire unit is normally the group of two ormore sections, because :-

   a. The gun position is not in view of the enemy, and therefore the concealment and control of four guns is possible.

   b. Indirect fire is usually employed at the longer ranges, when the fire of four guns is desireable to produce the requisite volume.

      In indirect fire positions, the normal distance between the gun is 15 yards.

2. The opening of fire rapidly and effectively, by indirect means depends on accuracy in the use of instruments and minute precision in drill. Such accuracy and precision can be attained only by a high standard of training and frequent practice.

/LESSON 68.....

LESSON 68

OBTAINING DIRECTION AND ELEVATION

STORES

Two vehicles complete with drill stores, two zero posts, four gun flags two megaphones and two parts boxes.

PERIODS

PREPARATION

See Introductory Notes. The two zero posts will be planted in line with no 1 gun flag.

INTRODUCTION TO LESSON

1. Detail four gun teams, order "Fall in" and "Mount." Bring the group into action and parallel the guns.

2. Order Nos 3 and drivers to join the spectators and split up the spectators behind each gun.

AIM

1. To teach the drill of placing direction and elevation on the guns in indirect fire.

2. To teach the drill for ensuring that guns will clear the crest.

B CONDUCT OF LESSON

OBTAINING DIRECTION

1. State that direction will be ordered in the following manner :-

All ..... degrees ..... minutes right (or left) of zero."
The No 1 will act as in Lesson 57.

2. Order a switch right or left of zero.

OBTAINING ELEVATION

3. Tell the squad that elevation will be given out in the following manner :-

/All .....

"All ..... hundred (or fifty) plus (or minus) ..... degrees ..... ,minutes." Or more rarely: "Nos 1 and 2 guns - hundred (or fifty) Plus (or minus) ..... degrees ..... minutes." "Nos 3 and 4 guns - hundred (of fifty) plus (or minus) .....degrees .....minutes." Nos 1 will act as in Lesson 41.

4. Order a suitable elevation.

CHECKING CREST CLEARANCE

5. State that it is the duty of the senior section commander to ensure that Nos 1 check for crest clearance.

The senior section commander estimates the range to the crest and adds 200 yards. Using this range, when the guns have been laid for elevation the senior section commander will order :-

"Check for crest clearance with sights at ....."

The Nos 1 will then set their tangent sights at the range ordered and see if the line of sight through the backsight and foresight clears the crest. If it does not, they will report to the senior section commander :-

"No .....gun does not clear crest".

The section commander will then report to the group commander :-

"Guns ready to load".

He will also report if any gun will not clear the crest.

6. Senior section commander should now order the checking of crest clearance.

7. Order "Load".

8. Order "Cease firing" and then practise the squad in coming into action, paralleling, obtaining direction and elevation, and checking crest clearance.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/LESSON 69 .....

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LESSON 69

CONTROLLED CORRECTIONS, INDIRECT

(ELEVATION)

A INSTRUCTOR'S NOTES

STORES

1. Gun carrier complete with drill stores.

PREPARATION

2. Detail a gun team and get the gun into action; when the gun is in action fall out the gun team, attach the dial sight, and plant the aiming post correctly. Set a suitable range on the range drum, level the bubble and adjust the lensatic sight onto the aiming post.

INTRODUCTION TO THE LESSON

3. Give the aim of the lesson.

4. The instructor should take post as No 1 and explain that the gun is already laid to engage a target. He should then order "Fire".

A INSTRUCTOR'S NOTES

AIM

5. To teach the soldier to apply corrections for eelevation to the dial sight.

B CONDUCT OF LESSON

CONTROLLED CORRECTIONS (ELEVATION)

6. Demonstrate that on the order "Stop, Up (or Down) ..... Hundred (or fifty)," the No 1 will adjust the range drum as ordered. He will then elevate or depress the gun by turning the handwheel until the bubble is central and adjust the lensatic sight onto the aiming post. He will then report "On".

7. Practise the squad in controlled corrections, using two guns if available.

/SUM UP .....

SUM UP

8. Sum up the main points.

CONCLUSION

9. Questions from the squad.

10. Further practice for backward men.

/LESSON 70 .....

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LESSON 70

CONTROLLED CORRECTIONS, INDIRECT (DIRECTION)

A INSTRUCTOR'S NOTES

STORES

Vehicles complete with drill stores.

PERIODS

PREPARATIONS

Detail a gun team, and get the gun into action. When the gun is in position, fall out the gun team, attach the dials ight and plant the aiming post correctly. Set a suitable range on the range drum and a switch on the deflection drums of the dial sight. Level the bubble and adjust the lensatic sight on to the aiming post.

INTRODUCTION TO LESSON

The instructor should take post as No 1 and explain that the gun is already laid to engage a target.

AIM

TO teach the soldier to apply corrections for direction to the dialsight.

B CONDUCT OF LESSON

CONTROLLED CORRECTIONS (DIRECTION)

1. State that normally a correction for direction is given as a new direction right or left of zero. When correcting on the observed strike of the bullets, however, the group commander may give the corrections as a cumulative order.

2. Order "Fire" and demonstrate that on the order "Stop .....degrees ..... minutes, Right (or left) of zero," the No 1 will set a new switch on the dial and deflection drums without reference to the rading already on the sight. He will then tap the gun until the lensatic sight is laid on the aiming post, and remain still.

/3. Practise the .....

3. Practise the squad.

4. Demonstrate that if the order was "Stop", Right (or left)..... degrees ..... minutes" the No 1 would add the amount to the reading on the appropriate deflection drum. He will then tap the gun until the lensatic sight is laid on the aiming post, re-level the bubble, and report "On".

5. Practise the squad.

CORRECTIONS FOR DIRECTION AND ELEVATION

6. State that occasionally a correction may be necessary for both direction and elevation.

7. Demonstrate that on the order "Stop, Right (or left) .....degrees ..... minutes, Up (or down) ..... hundred", the No 1 will set his dial sight accordingly and tap the gun until the lensatic sight is on the aiming post. He will then re-level the bubble, check again for direction and report "On".

8. Practise the squad in corrections for direction and elevation.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the squad.

2. Further practise for backward men.

/LESSON 71 .....

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LESSON 71

SYSTEM OF INDIRECT FIRE CONTROL

A INSTRUCTOR'S NOTES

STORES

1. Blackboard and chalk.

PREPARATIONS

2. Draw the diagrams given below on the blackboard.

PERIODS

INTRODUCTION TO LESSON

AIM

3. To give a general picture of the system of indirect fire control, before considering each part in detail.

B CONDUCT OF LESSON

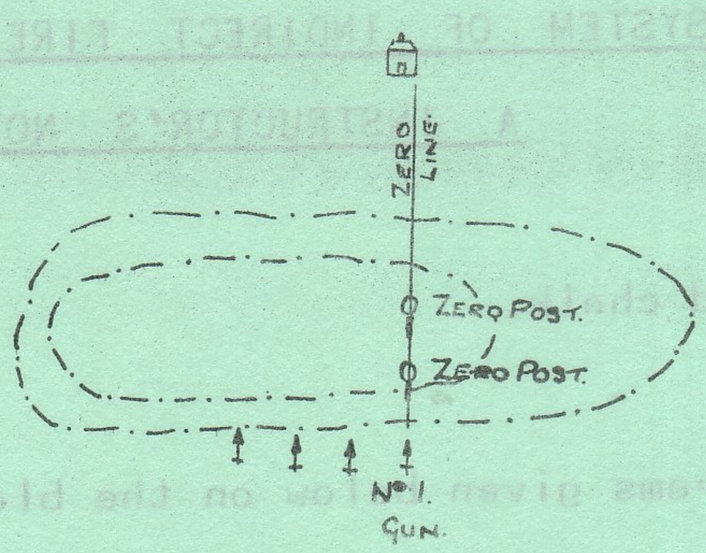
ZERO LINE

4. Explain that to obtain direction in indirect fire, an object is selected in the centre of the arc. The line from No 1 gun to this object is called the zero line. Once the pivot gun has been laid on this line, the group commander, by measuring the angle between the zero line and a target and ordering the pivot gun to swing through this angle, can get the gun laid on the target. To ensure accurate measurement of switches, the object selected for the zero line should be easily recognizable and clearly defined.

As the object selected for the zero line, will rarely be visible from the gun position, the line is prolonged into the gun position by means of zero posts. If the pivot gun is mounted so that it is laid directly through the zero posts, it will then be laid on the zero line.

Fig. On next page

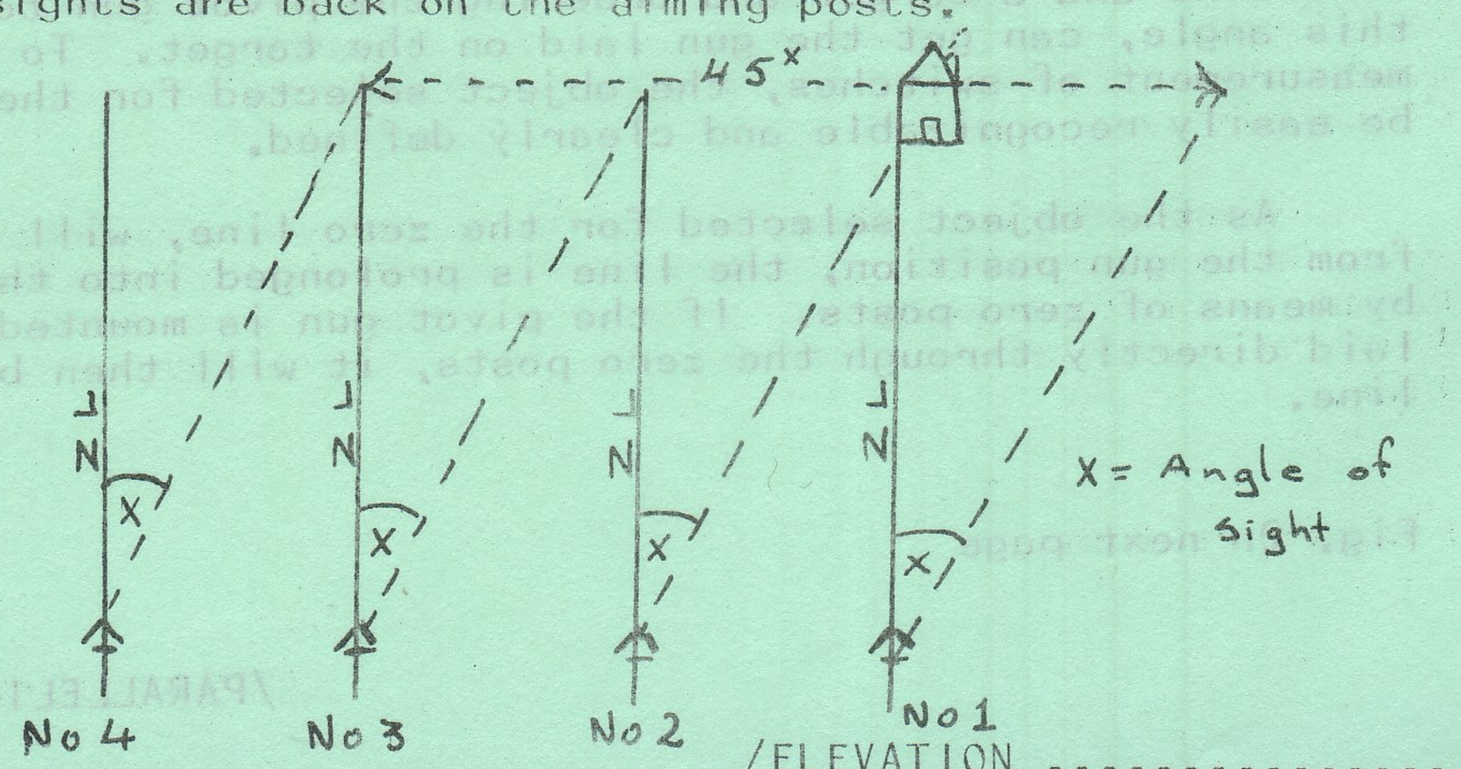
/PARALLELING .....



PARALLELING

5. Explain that when the pivot gun has been placed on its zero line, the remaining guns are paralleled to it. The direction dials and drums on all guns are then set at zero and lensatic sights aligned on the aiming post. If the guns are now switched through the same angle, they will still remain parallel and as the gun front age is normally 45 yards, their lines of fire will cover 45 yards.

At any time, the guns can be put back on their zero lines by resetting direction drums and dials at zero and tapping the guns until their lensatic sights are back on the aiming posts.



/ELEVATION .....

ELEVATION

6. When firing indirect, guns cannot be laid directly on the target. To place the elevation on the guns to hit the target, two components are required:-

a. The range gun-target - The range is usually determined by range-finder or map. If by rangefinder, it will probably be taken from the OP. The group commander must therefore remember to increase it by the distance between the gun line and the OP. The range is corrected for climatic conditions before being placed on the range-drum of the dial sight.

b. The angle of sight to the target - This is measured by the group commander with the director from a point on the crest in front of the gun line. The angle of sight from the crest is assumed to be the same as from the gun line. The angle of sight from the crest is assumed to be the same as from the gun line. The angle of sight is placed on the angle of sight drum of the dial sight. The bubble is now levelled. This has the effect of placing the tangent angle plus or minus the angle of sight ie, the quadrant angle on the gun.

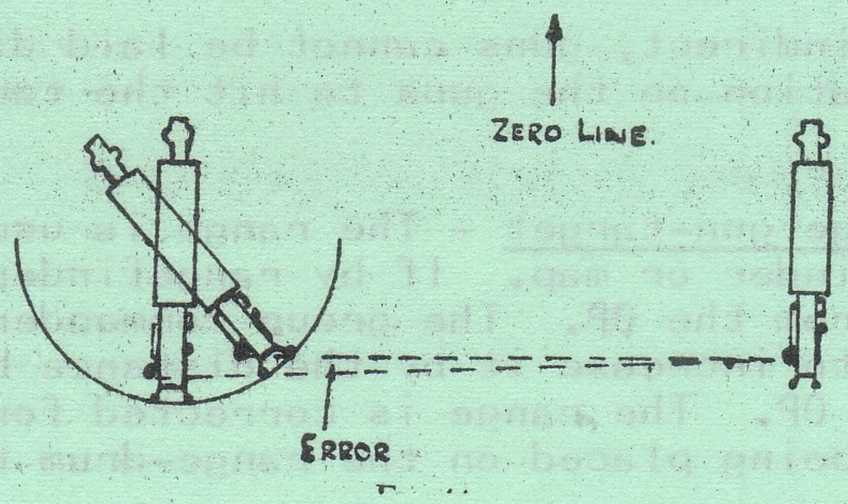
CREST CLEARANCE

7. Tell the class that on all occasions on which an indirect position is occupied, it must be ensured that the guns will clear the crest This is done by comparing the lowest elevation required in engaging the target, with the lowest elevation that will allow the cone of fire to clear the crest.

DIRECTION OF GUNS

8. State that as the dial sight is not attached at the point at which the gun pivots, the dial sight moves in an arc when the gun is swung through an angle. To avoid inaccuracies resulting from this, the guns must be mounted approximately in the direction of the zero line. As the angle through which the guns will then swing to bring them parallel on their zero lines will be small in consequence, the movement of the dialsight will not affect accuracy. If, however, the guns had not been mounted in the approximate direction of the zero line, an appreciable error would appear in paralleling (see Fig below)

/STAGGERING .....



STAGGERING OF GUNS

9. Describe how when guns are mounted for indirect fire, they are not in a straight line but staggered so that the dial sights of Nos 2,3, and 4 guns can be seen from the pivot gun.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the class.

/LESSON 72 .....

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LESSON 72

TARGETS OF EQUAL OR LESS WIDTH THEN THE GUN FRONTAG

A INTSTURCTOR'S NOTES

STORES

Blackboard.

PERIODS

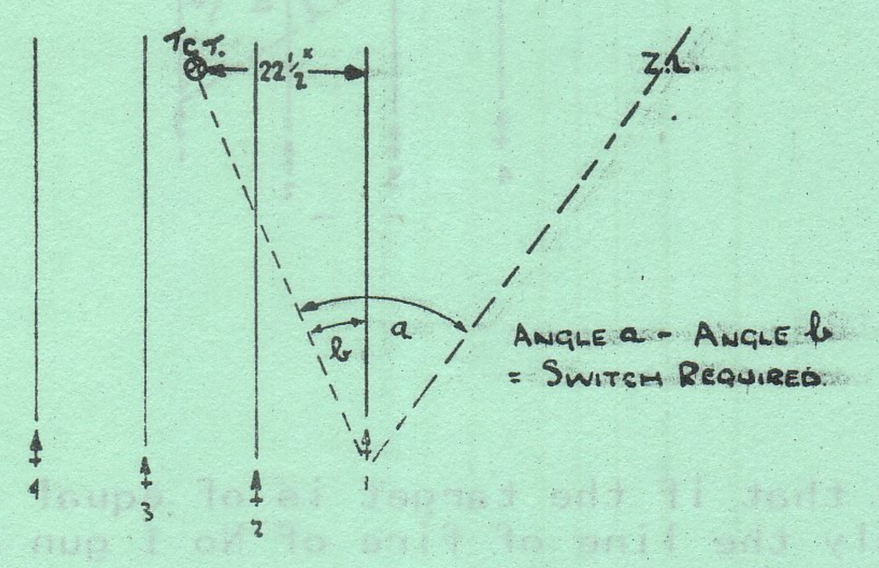
PREPARATION

Draw the diagrmas given in this lesson on the blackboard.

AIM

To teach the method of engaging a target of not greater width than the gun frontage, by indirect fire.

B CONDUCT OF LESSON



DIRECTION

1. Explain that when engaging a point target or a target of less width than the gun frontage, the parallel lines of fire of the four guns should be so laid that they straddle the target. As the lines of fire normally cover a frontage of 45 yards, the line of No 1 gun should fall $22\frac{1}{2}$ yards to the right of the centre of the target.

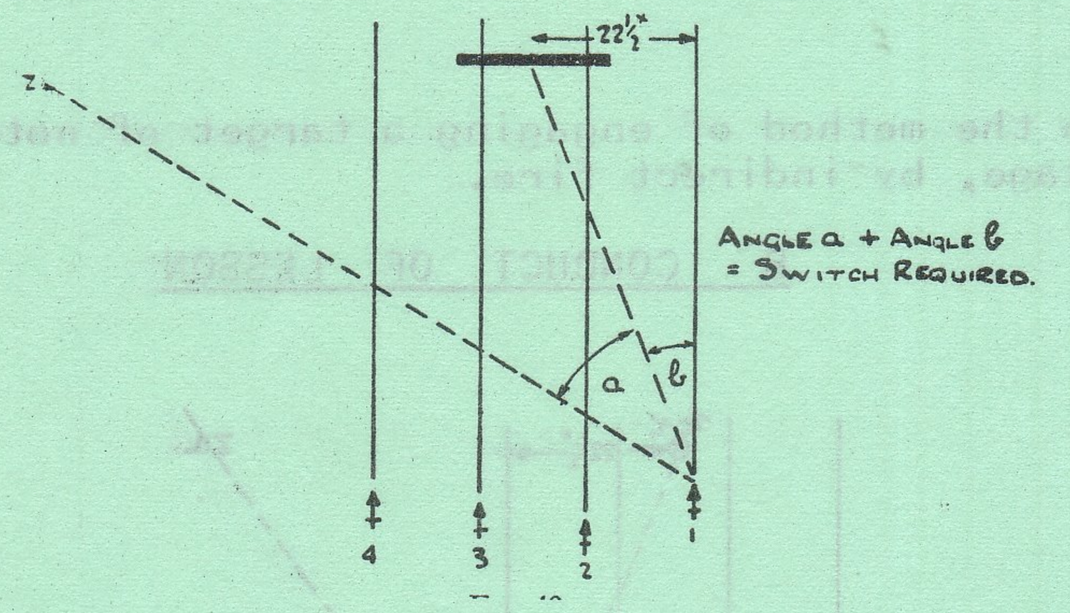
/TO .....

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To lay his guns for direction, the group commander should measure the angle between the zero line and the centre of the target with the director. When measuring angles, the director should as far as possible be mounted as a position in front of No 1 gun. The group commander should then obtain from the VI graph in the range table what $22\frac{1}{2}$ yards subtends as an angle at the range gun target.

By subtracting this from the angle between the zero line and the centre of the target, he will obtain the switch required. This switch will be ordered "All .....degrees.....minutes left of zero."

Should the target be on the right of the zero line, the angle subtended by $22\frac{1}{2}$ yardsat the range gun - target must be ADDED to the angle between the zero line and the centre of the target.



2. Explain that if the target is of equal width to the gun frontage, then obviously the line of fire of No 1 gun must be laid on the right end of the target. In this case, the group commander has simply to measure the angle between the zero line and the right end of the target and order this switch to the guns.

3. State that when measuring switches with the director, provided it is mounted not more than 30 yards to a flank or 100 yards in front or rear of the pivot gun, errors due to displacement will be negligible.

TAPPING

4. Tell the class that to cover the gaps between the lines of fire and

/to cater .....

to cater for errors in direction, guns are tapped right and left one tap.

ELEVATION

5. State that elevation is ordered to the guns as laid down. If no strike is observed, the combined sight rule is applied.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/LESSON 73.....

LESSON 73

TARGETS OF GREATER WIDTH THAN THE GUN FRONTAGE

A INSTRUCTOR'S NOTES

STORES

Blackboard.

PERIODS

PREPARATION

Draw the diagrams given in this lesson on the blackboard.

AIM

To teach the method of engaging a target of greater width than the gun frontage.

B CONDUCT OF LESSON

DIRECTION

1. Explain that to engage a target of greater width than the gun frontage, the system is to lay the parallel lines of fire on the centre of the target and to cover the extra width of the target by tapping right and left.

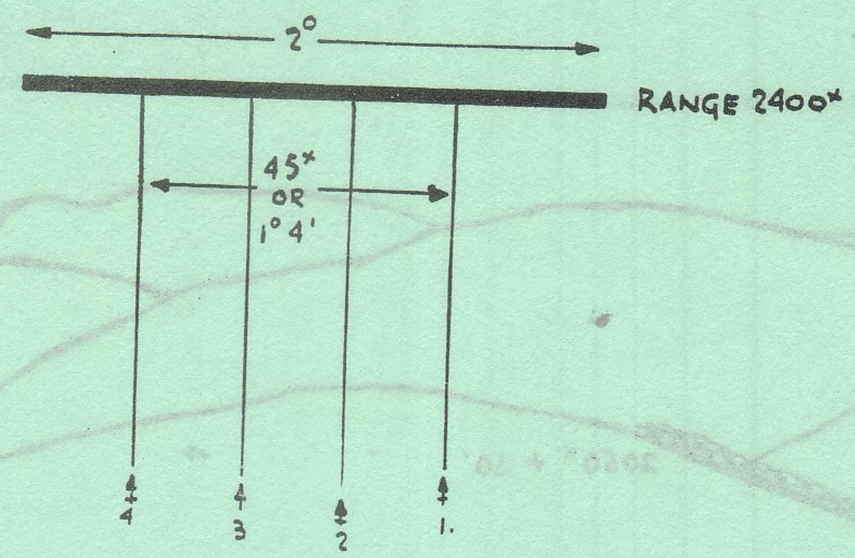
To lay the parallel lines of fire astride the target, the group commander should proceed as in Lesson 72.

2. Stat that to discover the number of taps required to cover extra width of the target, the group commander must measure the width of the target. From this, he should subtract the angle subtended by 45 yards at the range gun-target. This will give him the angle subtended by the extra width. Dividing this by two will give him the amount not covered by fire at each end of the target. This amount should be brought to the nearest number of taps. One extra tap should be added to cover errors in direction, and the total number of taps ordered to the guns in the form "Right and left .....taps."

Example :-

/ANGULAR .....

Example:-



Angular width target = 2°
45 yards at 2400 yards subtends = 1°4'

Extra width = 56'
Amount not covered each end = 56'/2 = 28' or two taps

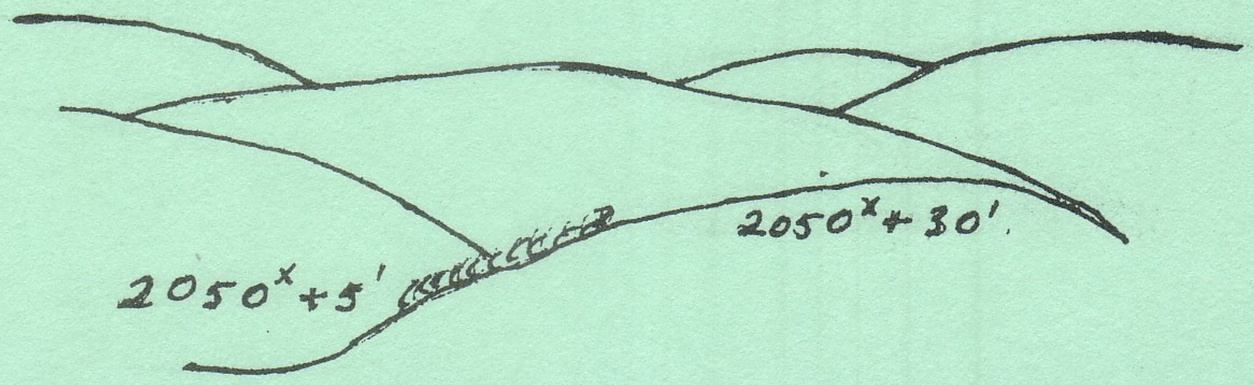
Add one tap to cover errors in direction.....three taps.
Order "Right and left 3 taps."

3. Tell the class that four guns should not engage a target requiring more than right and left 4 taps. If a target exceeds this, it should be split up and be engaged as separate targets.

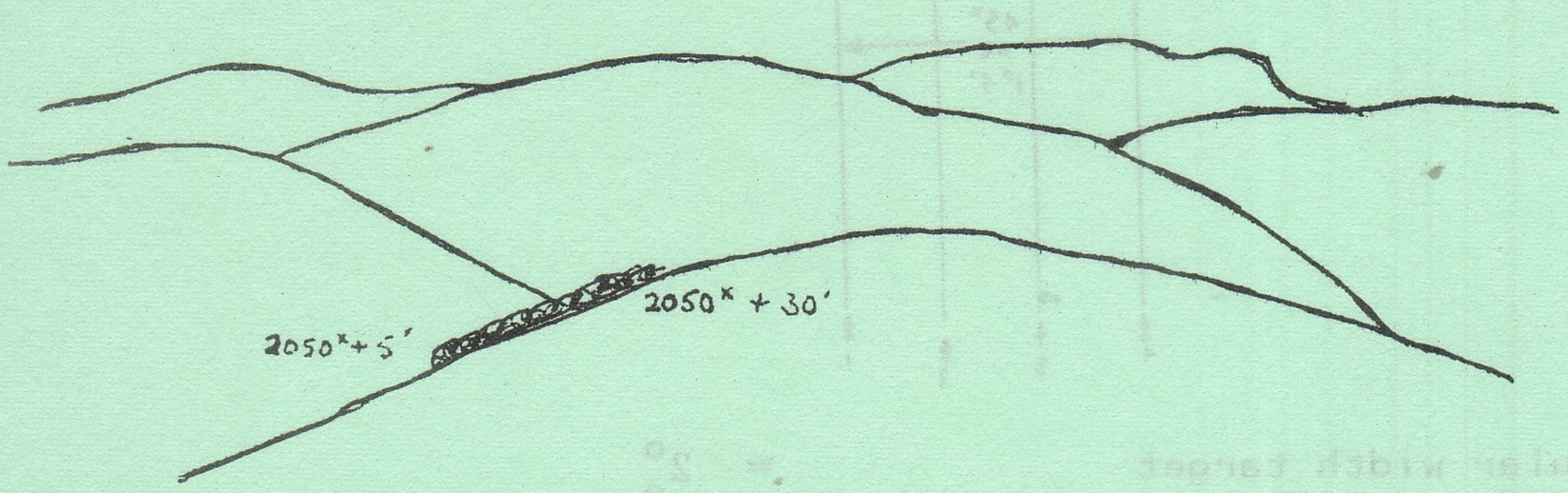
ELEVATION

4. State that elevation is ordered to the guns as laid down. If no strike is observed, the combined sight rule is applied.

5. Explain that should a target of greater width than the gun frontage have a different angle of sight but the same range to each end, the angle of sight to the right end will be ordered to Nos 1 and 2 guns and the angle of sight to the left end to Nos 3 and 4 guns (See fig below).



/Nos 1 .....



"Nos 1 and 2 guns, two owe fifty plus three owe minutes.
Nos 3 and 4 guns, two owe fifty plus five minutes."

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/LESSON 74. .....

LESSON 74

DEPTH TARGETS

A INSTRUCTOR'S NOTES

STORES

Lecture - Blackboard and chalk. Class require range tables.

PERIODS

PREPARATION

2. Draw the diagrams given below on the blackboard. For the practice the instructor should select zero line and targets and prepare fire orders.

B CONDUCT OF LESSON

AIM

3. To teach the method of engaging depth targets by indirect.

DIRECTION

4. State that :-

a. Targets, of equal or less width than the gun frontage are engaged for direction

b. Targets of greater width than the gun frontage are engaged for direction as in Lesson

ELEVATION

5. Explain that depth targets in indirect fire are engaged in a similar manner to direct fire. The group commander orders the range and angle of sight to hit half-way up the target. He then prders sufficient lifts in the form "All down fifty, All up one hundred to cover the depth of the target, guns being tapped right and left the number of taps ordered at each elevation.

6. State that the maximum dimensions of a depth target are 200 yards difference in the range of each end.

When engaging depth targets on rising ground, the group commander should order extra elevations at his own discretion.

/7. Demonstrate .....

7. Demonstrate engaging different types of depth targets on the blackboard.

SUM UP

8. Sum up the main points.

CONCLUCION

9. Questions to and from the class.

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LESSON 75

CREST CLEARANCE

A INSTRUCTOR'S NOTES

STORES

Blackboard.

PERIODS

PREPARATIONS

Draw the diagram given in the lesson on the blackboard.

INTRODUCTION TO LESSON

1. State that the responsibility for ensureing that the bullets will clear the crest is primarily the group commander's; the senior section commander has however certain responsibilities in this respect, and as a matter of drill, should always ensure that the bullets will clear the crest.

2. Explain that it is not always necessary or particable for the group commander to resort the measurement by instruments and calculation of crest clearances during his reconnaissance for the gun.

With practice it is usually possible to judge how far back the gun position can be without the risk of bullets falling to clear the crest. As a rough guide, if the group commander walks up the crest until he can just see the target and then sites the gun line three paces in rear, the guns should just clear the crest and yet the gun position be indirect to the target.

If however, the range is short and the slope steep, it is advisable for the group commander to determine the minum quadrantangle and to compare it with the lowest quadrant angle that he may require to engage his target, before deciding on his gun line. The procedure for doing so is given in paragraph 11.

3. The senior section commander should always determine the minimum quadrant angle and report this to the group commander when teporting "Guns on zero lines."

AIM

To teach the method of determining whether the bullets will

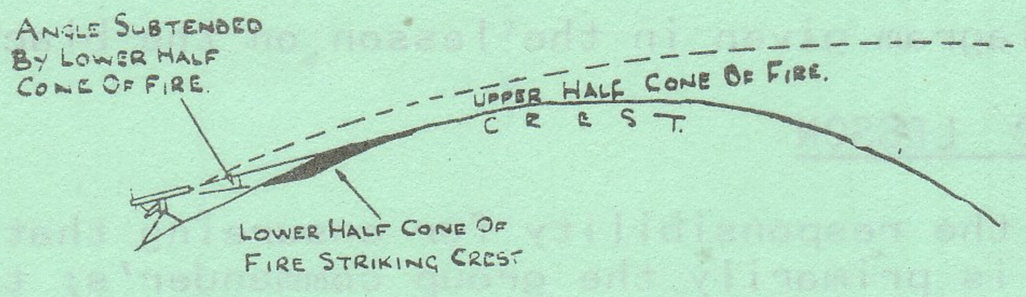
/clear .....

clear the crest in front of the guns.

B CONDUCT OF LESSON

THEORY OF CREST CLEARANCE

1. Tell the class that in order to lay a gun so that it would hit the crest, the range to the crest would be placed on the range drum, the angle of sight to the crest placed on the angle of sight and the bubble ;eve;;ed. If the gun was now fired, the lower half of the cone of fire would strike crest.



Therefore, to lay the gun so that it will just clear the crest the barrel must be lifted through the angle subtended by the lower half of the cone of fire at the range gun-crest.

Thus we have on the gun :-

a. Tangent angle for the range to the crest.

b. Angle subtended by half the cone of fire at that range.

c. Angle of sight to the crest.

a and b are constant for any given range and when added together are called the crest clearance angle. Crest clearance angles for all ranges from 50 to 4000 yards are given in the range tables.

Thus the minimum quadrant angle (the lowest angle that can be placed on the gun which will ensure that the whole of the cone of fire clears the crest) is composed of :-

The angle of sight to the crest and the crest clearance angle for the range to the crest.

PROCEDURE

2. State that :- /a. Immediately .....

a. Immediately the guns are in postion, the senior section commander will order the No 1 of the gun lowest down the crest to measure the angle of sight to the highest part of the crest over which the guns will fire.

b. The senior section commander will ascertain the range to the crest by estimation or range-finder.,look up the crest clearance angle for this range and add it to the angle of sight to the crest. He will then report this angle, the minimum quadrant angle (MQA), to the group commander, who will compare it with the lowest angle he will employ to engage the target. If the lowest quadrant angle is equal to or greater than the MQA the guns will clear the crest.

c. If necessary, the group commander can calculate the MQA before the guns come into action, measuring the angle of sight to the crest with the director.

3. Tell the class that after the guns have been laid for direction and elevation the Nos 1 will check clearance.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

/LESSON 76 .....

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LESSON 76

FIRE ORDERS INDIRECT

A INSTRUCTOR'S NOTES

STORES

1. Blackboard and chalk.

PREPARATION

2. Write the sequence of a fire order on the blackboard.

PERIODS

3. One period.

AIM

4. To teach the sequence and layout of an indirect fire order.

B CONDUCT OF LESSON

APPROACH

5. Give the aim of the lessons (See para 1 above).

SEQUENCE

6. Point out the sequence of an indirect fire order :-

Angle of switch (including wind allowance if necessary), Elevation (including wind allowance if necessary).
Load.
Right and left.....taps.
Rate of fire (if other than normal).
Fire.

EXPLANATION OF HEADINGS IN FIRE ORDER

7. Explain each heading of the fire order as under:-

a. Angle of switch. This will be given out as a switch right or left of zero. If a correction for the side wind is necessary, it will be added to, or subtracted from, the switch are given to the nearest 10 minutes.

/Examples .....

Examples :-

"All, one two degrees two zerominutes left of zero".
"All, three degrees five zerominutes right of zero".

b. Elevation - If a correction for atmospheric conditions or for wind is necessary, it will be added to, or subtracted from, the range before the latter is given out. Angles of sight are biven to the nearest five minutes.

Examples :-

"All, one eight fifty plus threezero minutes"
"All, one six hundred minus four five minutes"
"All, one seven hundred, angle of sight zero"
"Nos 1 and 2 guns, one five fifty plus three zerominutes,
Nos 3 and four guns, one five fiftly plus two zerominutes".

c. Right and left ..... taps - THE number of taps varies with the width of the target. Nos 1 and 3 guns will always tap to the right first; Nos 2 and four guns to the left.

ORDERS DURING A SHOOT

8. Corrections to direction will be given out in the form :-
"All, left three zerominutes".
Corrections to elevation will be given out in the form :-
"All, down fifty"
"All, up one hundred."
These orders may be given out verbally of by signal.

DUTIES OF SENIOR SECTION COMMANDER

9. During the issue of indirect fire orders, the senior section com-- mander is responsible for :-

a. Repeating back all fire orders tp the group commander before passing them on to the guns.

b. Following all fire orders by recording all angles, switches etc. He should periodically check direction and elevation by ordering -
"Check direction and elevation- you should now read- direction .....degrees .....minutes , right (or left) of zero, and elevation.....yards, plus (or minus) .....degrees.....minutes".

c. After each heading of the fire order has been complied with,

/reporting.....

reporting "Ready" to the group commander as an indication that he is ready to receive the next heading of the fire order.

d. Calculating and reporting the minimum quadrant angle MQA (see lesson)

e. Ordering the range at which nos 1 will check for crest clearance.

SUM UP

10. Main points of lesson

CONCLUSION

11. Question to and from squad.

/Lesson 77 .....

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LESSON 77

APPLICATION OF INDIRECT ORDERS

A INSTRUCTOR'S NOTES

STORES

Two vehicles complete with stores, two zero posts, four gun flags and two spare parts boxes.

PERIODS

PREPARATION

See Introductory Notes. The two zero posts will be planted in line with No 1 gun flag.

POINTS TO BE CONSIDERED DURING LESSON

This lesson must also be practice for lessons 72, 73, 74, 75 and 76.

INTRODUCTION TO LESSON

1. Detail four gun teams, order "Fall in" and "Mount".

2. Bring the guns into action. When the guns have been paralled, order the Nos 3 and drivers to join the spectators and split up the spectators behind the four guns.

3. Give a switch and elevation and order "Load."

AIM

To teach the squad how to apply the method of fire and to teach the method of reporting "On".

B CONDUCT OF LESSON

TAPS

1. State that in indirect fire, the number of taps to be employed will be ordered by the group commander. It will never be more than four or less than one. The guns will tap as they do by sections, ie No 1 and 3 guns tap first to the right, No 2 and 4 guns tap first to the left.

/2. Tell .....

2. Tell the squad that on the command "Right and left - taps". No 1 will report "On" No 2 and the junior commander will indicate that the guns are ready to fire by raising their hands. Similarly, when the guns have reported "On", the senior section commander will indicate the fact to the group commander by raising his hand.

3. State that on the order or signal "Fire" the section commander will lower their hands. Taking their time from the junior section commander, the Nos 2 will shout "Fire" and lower their hands. On the ORDER or signal "STOP" this will be repeated by section commanders and Nos 2.

4. Exercise the squad in reporting "On", "Fire" and "Stop".

INDIRECT FIRE CONTROL SIGNALS

5. Fall the squad in the centre of the gun line and demonstrate the following signals :-

a.	Add 50 yards	Both arms raised at angle of 45 degrees from the head.	
b.	Drop 50 yards	Both arms raised ad angle of 45 degrees from the side.	
c.	Right 30 minutes	Right arm horizontal and left arm straight above the head.	
d.	Left 30 minutes	Left arm horizontal and right arm straight above the head.	

Repeating the above signals implies a corresponding increase in the correction, eg, a repeated three times means add 150 yards.

6. Practise the squad in recognizing these signals.

7. Order "Fall in" and "Take Post".

CONTROLLED CORRECTIONS

8. State that corrections for elevation will be ordered or signalled as follows :- "Stop", "All, add (or drop)-hundred (or fifty)" "Go on".

The senior section commander will acknowledge and repeat back the

/orders .....^

orders or signals and will then pass on the corrections verbally to the Nos 1. He will not order "Go on," but wil order "Fire" when guns have reported"on" No 1 will act as in Lesson .

9. Stress that whenever a downward correction is ordered ,Nos 1 will automatically recheck for crest clearance before reporting "On".

10. Explain that corrections fro direction are given in a similar manner. Nos 1 will act as in Lesson .

11. Practise the squad in applying controlled corrections.

CHECKING DIRECTION AND ELEVATION

12. Tell the squad that, during firing, the senior section commander will periodically check the direction and elevation on the guns by calling "Check direction and elevation; you now read aloud ..... degrees.....minutes right (or left) of zero and .....hundred (or fifty) plus (or minus) .....degrees.....minutes". Nos 1 will check that they have the readings on their dial sights.

The section commander can use the spare rangetaker to note down all orders from the group commander so that the he has a record of the switches and elevations ordered.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions from the squad.

2. Further practice in the whole process of coming into action and engaging a target.

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LESSON 78

FIRE CONTROL CHARTS

A INSTRUCTOR'S NOTES

STORES

1. Blackboard, a supply of fire control.

2. Two vehicles complete withd rill stores, two zero posts, four gun flags, two megaphones and two spare parts boxes. Three prepared fire control charts and three watches.

PERIODS

PREPARATIONS

1. Draw a specimen fire control chart on the blackboard.

2. The two zero posts will be planted in line with the No 1 gun flag. The instructor must prepare three fire control charts for use during the lesson.

INTRODUCTION TO LESSON

1. State that for the conduct of programme shoots, when fire is required at stated periods on one or more targets, it will be preferable to issue charts for the control of fire. Such charts are usually desirable for shooting off the map and firing by night.

When the guns have been paralleled, the group commander will call for section commanders and issue a fire control chart to each and synchroniese watches. These charts contain the necessary data for each section, while that used by the group commander contains the data for all four guns. When using fire control charts, section commanders will supervise the work of their own sections. By night, section commanders will work of their own sections. By night, section commanders will give orders to each gun in turn in order to avoid unnecessary noise.

2. Detail four gun teams, order "Fall in" and "Mount".

3. Bring the guns into action and have them paralleled.

Tell the Nos 3 and drivers to join the spectators, and split them up behind the guns. Issue the fire control charts to the section commanders.

/AIM.....

AIM

To teach the use and method of compiling fire control charts.

B CONDUCT OF LESSON

COMPILING FIRE CONTROL CHARTS

1. Fire control charts are made up by group commanders. They are prepared from data obtained during reconnaissance. Normally during programme shoots by day or night section commanders command their own sections under the supervision of the group commander. Fire control charts are therefore required for the group commander showing the data for all four guns, and for each section commander showing the data for their respective guns.

2. Explain each heading of the fire control chart. The charts contain the actual detail of switches, timings and rates of fire and the elevations and number of taps to the employed for each target.

State that time must be allowed in the chart for the lifts and switches to be put on the guns. At night a pause of 30 seconds should be allowed for each lift and 60 seconds for each switch. When tapping right and left is required, the time taken to complete the series of bursts and taps should also be allowed for.

In prolonged shoots, pauses should be allowed for the maintenance of the guns. These pauses should be arranged so that never more than one gun is stopped for this purpose.

FIRE CONTROL CHARTS

3. Order "Prepare for Task 1."

Section commanders should now order :-

"All .....degrees.....minutes right (or left) of zero"
"All.....hundred (or fifty) plus (or minus)....degrees .....minutes."

The switch and elevation is obtained from the fire control chart. They should then order "Load", "Right and left taps" and "Rest".. The section commanders report that their sections are ready to fire.

4. At the time laid down on the chart, the group commander orders "Fire". The rates of fire and lifts shown in the fire control chart are controlled by the section commanders.

/SUM UP.....

SUM UP

Sum up the main points.

CONCLUSION

1. Questions to and from the squad .

2. Opportunity should be taken of practising fire controllers in compiling fire control charts, when working out map shooting or night firing problems.

/CHAPTER 13.....

CHAPTER 13

NIGHT FIRING

INTRODUCTORY NOTES

1. This chapter contains the arrangements to be made to engage a target at night. These arrangements can be applied to conditions of bad visibility such as fog or smoke.

2. The following are the occasions on which machine guns may be required to fire at night :-

a. When sections are in direct fire positions before darkness falls, with guns laid and aiming posts planter. In order to be able to fire on a fixed line during the night, aiming lamps must be put out.

b. When section are required to occupy positions by night ready to fire on fixed lines. To lay the guns on their on which the fixed lines, light must be shown either from the place on which the fixed line is to fall or from a locality to be protected.

c. When a group is in an indirect fire position before darkness falls with guns on zero lines. In order to engage targets during the night, aiming lamps must be put out and fire control charts prepared.

d. When a group is required to occupy a position by night to engage a target or series of targets, but the reconnaissance of the position can be carried out in daylight.

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LESSON 79

CHANGING FROM INDIRECT FIRE TO NIGHT FIRE AND VICE VERSA

A INSTRUCTOR'S NOTES

STORES

Two vehicles with gun stores, four gun flags, two zero posts two aiming lamps and two spare parts boxes.

PERIODS

PREPARATION

Two zero posts planted in line with No 1 gun and gun flags in position.

INTRODUCTION TO LESSON

1. Detail four gun teams, order "Fall in" and "Mount".

2. Bring the guns into action. When the guns have been paralleled, order the No 3 and drivers to join the spectators and split the spectators behind the four guns.

3. Order a switch and elevation, and "Load" and practise the group in a fire order.

4. Order "Stop" and "Rest".

5. Explain that if the group is required to continue firing on the target after dark the preparation are similar to those for direct fire. The Nos 3 of the odd sub-section will be sent back to collect the night firing stores.

Send the No 3 back to fetch the aiming lamp and 3 handlamps each.

AIM

To teach the drill of changing from indirect fire to night firing and for changin back to indirect fire again.

B CONDUCT OF LESSON

CHANGING TO NIGHT FIRING

/1. Explain .....

1. Explain that the change over will only entail the following duties :-

The Nos 1 will check their aims on the aiming posts, and the senior section commander will order "Unload," "Clear guns."

2. Order "Positions." Tell the Nos 1 to relay their guns an then order "Unload" and "Clear guns".

3. When the guns have been reported clear, explain that the senior section commander will order "Out aiming lamps." On that order :-

a. The Nos 1 will close the rear cover.

b. The Nos 3 of the odd sub-section will put out the aiming lamps, secure the boxes, attach the lines to the switches and bring the reels back to the section commander.

c. Nos 1 will then align their lensatic sights on the aiming lamps.

4. Order "Out aiming lamps" and when the lamps have been fitted order "Load" and "Fire" followed by "Stop". Changing back to indirect fire.

5. Explain that to change from night firing to indirect fire, after "Stop" has been ordered and the Nos 1 have relaid their guns, the senior section commander will order "Unload," "Clear guns". When the guns have been reported clear "In aiming lamps" will be ordered and the duties are as follows :-

a. Nos 1 close the rear cover.

b. Nos 3 reel in the line and bring in the aiming lamps.

c. Nos 1 will align the lensatic sights on the aiming posts.

6. Order "Unload", "Clear guns", "In aiming lamps".

7. Practise the squad in changing to night firing and back again.

SUM UP

Sum up the main points.

CONCLUSION

1. Questions to and from squad.
2. Further practice if time allows.

/LESSON 80 .....

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LESSON 80

RECONNAISSANCE AND PREPARATION OF A NIGHT FIRING POSITION

A INSTRUCTOR'S NOTES

STORES

Lecture - Blackboard, chalk and director.
Practise - Directors, gun flags, four zero posts and four directions pegs.

PERIODS

PREPARATION

Draw the diagrams given on the following pages.

AIM

To teach how to obtain the necessary data and to prepare a position for engaging targets by night.

B CONDUCT OF LESSON

OBTAINING DATA

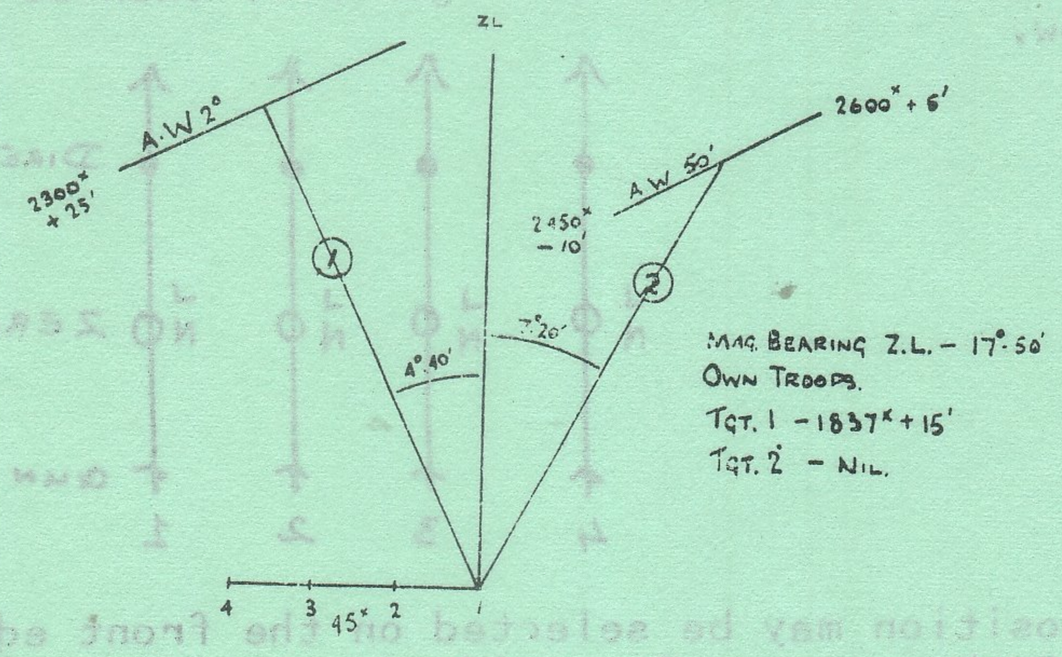
1. State that before darkness falls, all data to engage the various targets must be obtained. This will include some or all of the following :-

Angles of sight and ranges.
Angular width of targets.
Angles of switch from zero line to targets.
Date affecting safety.
Magnetic bearing of the zero lines (This is required as a check to prevent a major error)

2. Explain the methods of recording date. An example is given below

/PEGGING .....

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MAG. BEARING Z.L. – 17°-50'
OWN TROOPS.
TGT. 1 – 1837ˣ + 15'
TGT. 2 – NIL.

PEGGING THE POSITION

3. State that before dark the position must be pegged as follows :-

a. A gun position and zero line are selected. As the position will not be occupied until after dark, the zero of each gun will have to be marked by zero posts and direction pegs.

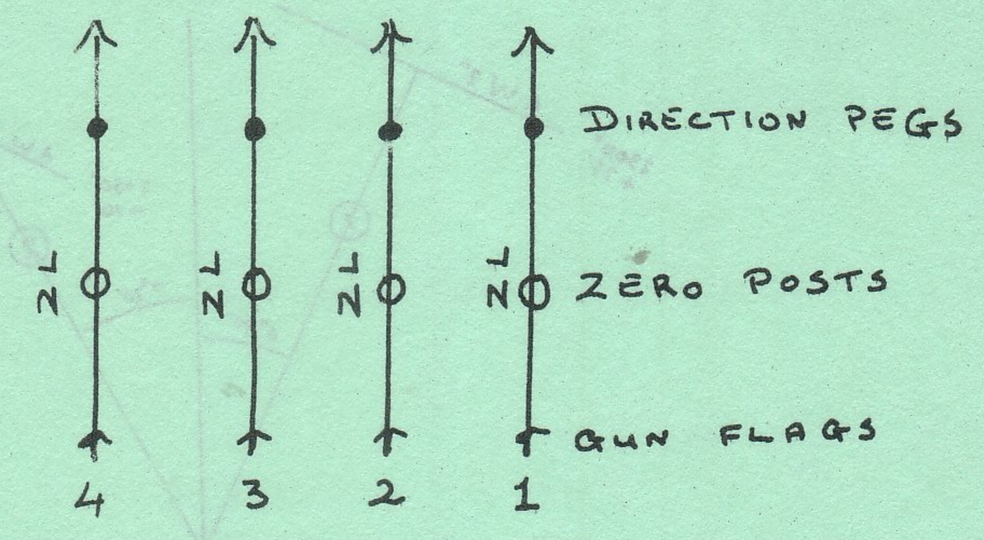
b. Mount a director so that the hairline can just be laid on the zero line for the pivot gun; all drums and dials must be at zero. Swing the director through 180° and get an assistant to plant a direction peg accurately in line with the hairline about 15 yards away. A zero post is planted in a similar manner about 30 yards away, and then the gun flag another 15 yards away. When engaging targets of less width than the gun frontage the procedure should be as given in Lesson .

c. Mount the director over the pivot gun flag, lay it through the zero line, with the direction dial sight at 180°, and put out the remaining gun flags. Using the deflection drums, swing the director on to each of the other gun flags and note the angles on paper.

d. Mount the director over each of the other gun flags in turn and, with the dial and drums set at the angle measured for the gun flag at which the director is mounted, lay the hairline on the pivot gun flag and lock the head. Zero the director and get an assistant to plant out first a zero post and then a direction peg accurately, in line with the hair-

/line.....

line. The zero line for each gun will then be pegged as in Fig below.



4. Sometimes a position may be selected on the front edge of cover which is in view of the enemy. To avoid exposing personnel in front of the cover, it will be necessary to place the direction pegs and zero posts in rear of gun flags. (See fig below).

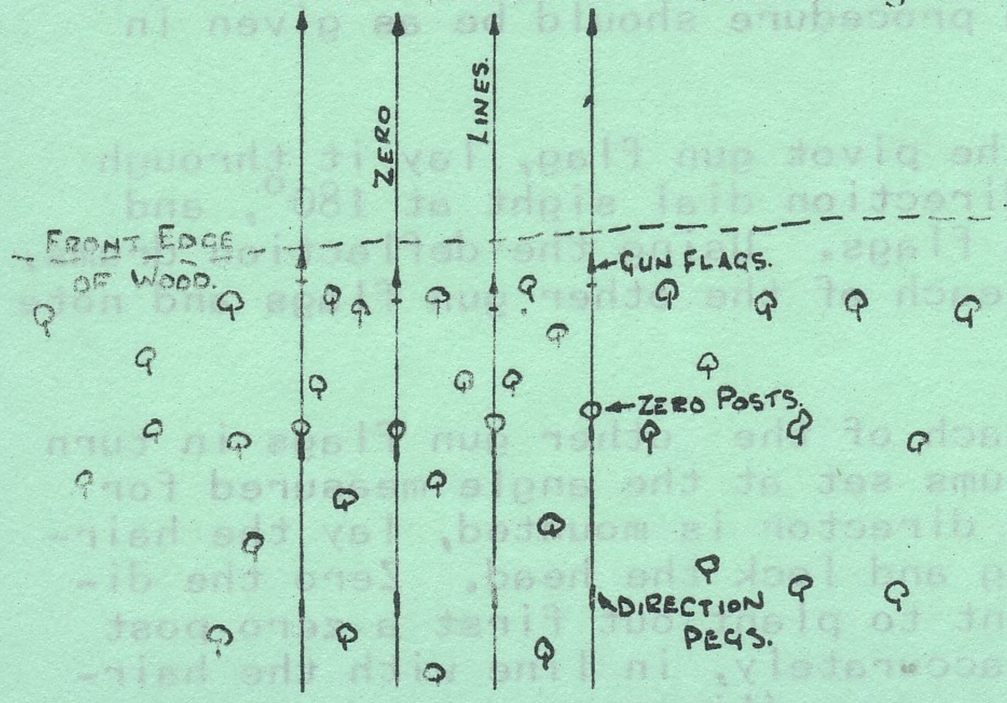
In this case, to peg the zero line for the pivot gun, the director should be mounted over the pivot gun flags, and laid on the zero line with the deflecting drums and dials at zero. It should then be swung through 180° and the post and peg placed on this line. The angles to the remaining guns are then read off and pegs and posts placed out as before.

OCCUPATION

5. After dark when the guns are brought up, the procedure is as described in Lessons 81 and 82

PRACTICE

6. Revise the method of recording data.



/7. PRACTISE .....

7. Practise the squad in recording data from targets indicated by the instructor.

8. Explain and demonstrate pegging with pegs in front of the gun line.

9. Practise the squad.

10. Explain and demonstrate pegging with pegs in rear of the gun line.

11. Practise the squad.

12. Further practise as required.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

LESSON 31

COMING INTO ACTION AND CEASE FIRING BY NIGHT

A INSTRUCTOR'S NOTES

STORES

Two vehicles complete with gun stores, four gun flags, four zero posts, four direction pegs, seven hand lamps, and two aiming lamps.

PERIODS

PREPARATION

See Introductory Notes. One direction peg and one zero post should be planted in line with each gun flag. Vehicles should be drawn up a suitable distance in rear of their respective gun flags.

INTRODUCTION TO LESSON

1. Explain that machine gun group can come into engage targets by night if there has been sufficient time in daylight for the group commander to obtain the date required to hit the target and to peg the position.

2. Although this lesson is taught in daylight, noise should be reduced to a minimum and gun numbers should not double.

AIM

To teach the drill of coming into action by night and of cease firing.

B CONDUCT OF LESSON

"PREPARE FOR NIGHT FIRING"

1. State that the loads will be allocated by the section commanders before the group arrives at the point where stores are to be off-loaded.

2. Explain that at the off-loading point, section commanders will order "Prepare for night firing". Gun teams will then unload the stores as already detailed and sections will fall in, in file, in front of the vehicle. Each section commander will check to see that all necessary stores have been off-loaded and then lead his section for-

/ward.....

ward to a position in rear of his gun flags. Each section commander will call up his Nos 1 and show them their gun flag, the direction of the rear leg of the tripod and the direction of the zero post and direction peg.

3. Section commanders should now order "Prepare for night firing" and act as in para 2 above.

COMING INTO ACTION

4. Explain that Nos 1 will order quietly "No ..... gun for night firing, mount gun." On that order, Nos 1 and 2 will mount their gun over the gun flag. The shoes of the tripod will not be stamped in, and the dial sight will be attached to the gun. Nos 3, when called up by Nos 1, will bring all the ammunition up to the gun and position themselves on the left of the gun ready to assist the No 1. In addition, the Nos 3 of the odd sub-section will bring up the aiming post and lamp. All the Nos 3 will take over a hand lamp from their Nos 1.

5. Order the Nos 1 to get their guns mounted.

6. Order "Stand clear" and fall the squad in in the centre of the gun line.

"CEASE FIRING"

7. State that when the group commander orders "Cease firing", the section commanders will order :-

"Unload," "Clear guns," "Remove dial sights," "In aiming lamps".

8. Order "Fall in," "Take post," and "Load".

9. Order "Cease firing".

10. Tell the squad that the section commanders will now issue orders as in para 7 and when the aiming lamps are collected will order "Cease firing". The guns will be dismounted and the section commanders will fall in their sections and check stores. The section commander is responsible for the flags, pegs and zero posts. The section will then move back to the vehicles, replace stores and mount. Each No 1 will report to the section commander when his carrier is ready to move off.

11. Tell the section commanders to order "Cease firing".

SUM UP

Sum up the main points.

/CONCLUSION .....

CONCLUSION

Congratulations! You've completed the Getting Started tutorial. You've learned how to:

- Create a new project
- Add and configure sections
- Add and configure boosters
- Add and configure finders
- Add and configure couplers
- Add and configure terminators
- Add and configure connectors
- Add and configure routers
- Add and configure combiners
- Add and configure splitters
- Add and configure mergers
- Add and configure diverters
- Add and configure crossovers
- Add and configure turnouts
- Add and configure signals
- Add and configure sensors
- Add and configure switches
- Add and configure LEDs
- Add and configure servos
- Add and configure stepper motors
- Add and configure DCC accessory decoders
- Add and configure DCC signal decoders
- Add and configure DCC extended accessory decoders
- Add and configure DCC speed and direction decoders
- Add and configure DCC function decoders
- Add and configure DCC configuration variable decoders
- Add and configure DCC consisting decoders
- Add and configure DCC signal mast decoders
- Add and configure DCC signal head decoders
- Add and configure DCC signal matrix decoders
- Add and configure DCC signal multiplexer decoders
- Add and configure DCC signal repeater decoders
- Add and configure DCC signal splitter decoders
- Add and configure DCC signal merger decoders
- Add and configure DCC signal diverter decoders
- Add and configure DCC signal crossover decoders
- Add and configure DCC signal turnout decoders
- Add and configure DCC signal switch decoders
- Add and configure DCC signal LED decoders
- Add and configure DCC signal servo decoders
- Add and configure DCC signal stepper motor decoders
- Add and configure DCC signal DC motor decoders
- Add and configure DCC signal relay decoders
- Add and configure DCC signal solenoid decoders
- Add and configure DCC signal valve decoders
- Add and configure DCC signal pump decoders
- Add and configure DCC signal fan decoders
- Add and configure DCC signal heater decoders
- Add and configure DCC signal cooler decoders
- Add and configure DCC signal sensor decoders
- Add and configure DCC signal switch decoders
- Add and configure DCC signal LED decoders
- Add and configure DCC signal servo decoders
- Add and configure DCC signal stepper motor decoders
- Add and configure DCC signal DC motor decoders
- Add and configure DCC signal relay decoders
- Add and configure DCC signal solenoid decoders
- Add and configure DCC signal valve decoders
- Add and configure DCC signal pump decoders
- Add and configure DCC signal fan decoders
- Add and configure DCC signal heater decoders
- Add and configure DCC signal cooler decoders

COMING INTO ACTION

Section commands should now output "Reverse for right turn" and "Reverse for left turn" as appropriate.

STOP

RESTRICTED

CONCLUSION

1. Questions from the squad.

2. Furhter pratise at night time.

/LESSON 82 .....

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LESSON 82

OBTAINING DIRECTION AND ELEVATION BY NIGHT

A INSTRUCTOR'S NOTES

STORES

1. Two vehicles complete with gun stores, four gun flags, four zero posts, four direction pegs, seven hand lamps and two aiming lamps, three prepared fire control charts.

PREPARATION

2. See Introductory Notes. One direction peg and one zero post should be planted in line with each gun flag. Vehicles should be drawn up a suitable distance in rear of their respective gun flags.

PERIODS

AIM

3. To teach the method of placing guns on zero lines and of laying them to hit the target by night.

B CONDUCT OF LESSON

PRELIMINARIES

4. Safety precautions.

APPROACH

5. Give the aim of the lesson (see para 1 above).

6. Detail four gun teams, order "Fall in," and "Mount" and bring the guns into action for night firing.

7. Fall out all except Nos 1, 2 and 3 of No 1 gun and move squad to the rear of the gun.

PLACING GUNS ON ZERO LINES

8. State that the zero line for each gun has been pegged in daylight by the group commander.

9. Demonstrate that the section commander will take the No 3 of the odd sub-section, complete with aiming lamp and post, to the direction peg. He will tell the No 3 to place the aiming lamp behind the di-

/rection peg .....

rection peg and switch it on, so that the peg is outlined against the lamp. He will then go back to the gun and order :-

"No 1 gun, zero line."

10. On this order, the No 1 will ensure that the dial and deflection drums are at zero, and the lensatic sight latched. Assisted by the No 2, he will move the gun until the line of sight through the lensatic sight is alighed on the zero post and aiming lamp. He will then order the legs to be stamped in, recheck the aim and order the No 2 to zero the tripod dial.

The No 3 of the even sub-section will assist the No 1 by shining a hand lamp on to the front of the lensatic sight.

When the No 1 is satisfied that he has a correct aim, he will report "No 1 gun, correct," to the section commander.

11. Tell the squad that the section commander will then repeat the process with his other gun. When both guns are on their zero lines, he will collect the zero posts, and return to his position in between his two guns. The No 3 of the odd sub-section will plant the aiming post, put on the aiming lamp and ureel the line back to the section commander. When the lamp is switched on, both Nos 1 will free- wheel their lensatic sight on to it. The Nos 3 will take up their positions on the left of their guns.

12. Order "Take post" and practice the squad in laying the guns on zero lines.

DIRECTION AND ELEVATION

13. State that the direction and elevation are given from the fire control charts which are always used at night. Issue the charts and order "Prepare for Task 1." The procedure is now as in Lesson

SUM UP

14. Sum up the main points of the lesson.

CONCLUSION

15. Questions to and from squad.

/CHAPTER 14.....

CHAPTER 14

MAP SHOOTING

INTRODUCTORY NOTES

1. Accurate shooting from the map is only possible when a map of scale 1/25,000 or larger is available. Where accuracy is not essential, for example for the engagement of areas well removed from the position of our own troops, maps of smaller scale can be used, but it should be noted that the detail on such maps is not surveyed in.

2. The principle of map shooting is that all calculations both for direction and for elevation are made from the map. The method has certain advantages, namely :-

No observation is necessary.
Targets can be engaged that cannot be seen from the ground.
Preparations can be made to open fire before the actual targets have been located.
Any number of targets can be engaged by switches.
It is just as flexible by night as by day.

It has also certain disatvantages, namely :-

1/25,000 maps are not always available.
Maps are liable to distortion.
Accurate location of points on the map is often difficult.
Corrections by observation of fire are not possible, there being no OP.

3. The method entails :-

a. Locations of the pivot gun on the ground, and marking its position on themap.

b. Laying out the zero line for the gun, or for all guns if a night shoot is required.

c. Location of target or targets on the map and calculating the data to hit them.

The process a and b must be carried out in daylight, through the guns themselves need not be brought into action until after dark. Therefore, orders for a map shoot to be carried out at night must reach the group in sufficient time before dark,

/LESSON 83 .....

LESSON 83

THE RESECTOR PROTRACTOR

A INSTRUCTOR'S NOTES

STORES

1. One resector protractor, map and mapboard per student. One director for every two students.

PERIODS.

PREPARATION

3. The instructor must select a suitable position for the pivot gun beforehand.

AIM

4. To teach the officer or NCO to determine the position of the pivot gun on the map by means of the resector protractor.

B CONDUCT OF LESSON

APPROACH

5. State the aim of the lesson.

RESECTOR PROTRACTOR

6. Describe the instrument. The squad should follow the instructor's description with their instruments. The resector protractor consists of :-

a. A protractor graduated from left to right and from right to left in degrees, and containing romers for scales of 1/20000, 1/25000, and 1/63360. It has three pin holes drilled in it.

b. A fixed arm containing graduations in hundreds of yards for a scale of 1/25000, a scale of angles of sight in minutes and two pin holes. One edge of the arm is bevelled.

c. A lower pivoting arm with graduations in hundred of yards for a scale of 1/10000, a scale of angles of sight in minutes and two pin holes. The arm is continued on the opposite side of the pivot in the form of a tail. One edge of the arms is bevelled. , /d. An .....

d. An upper pivoting arm with two pinholes, one bevelled edge and a tail on the opposite side of the pivot. The arm has a scale of 1/63360.

e. A clamping screw with pencil hole.

OBTAINING DATA

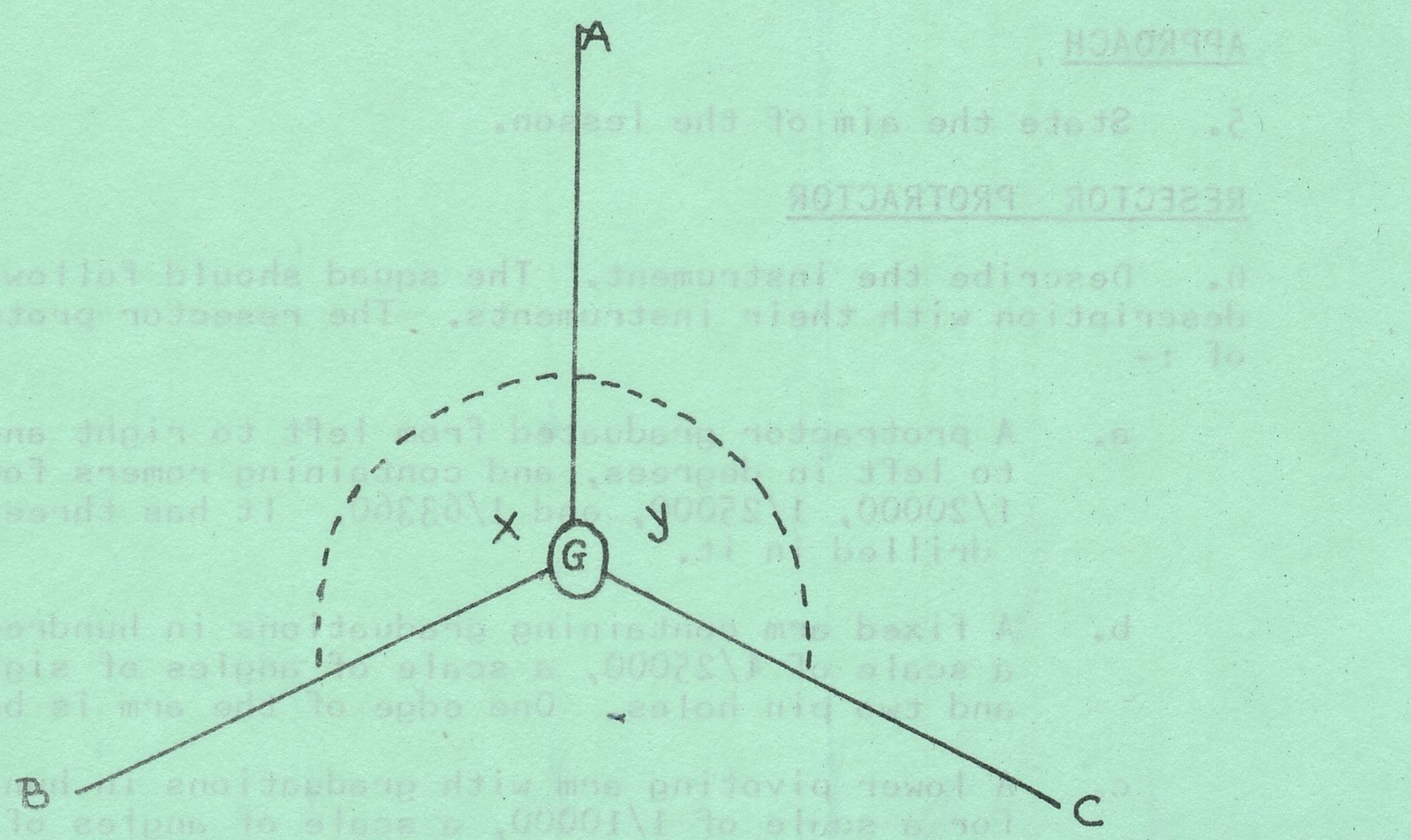
7. Move the squad to the side selected for the pivot gun and erect the director over the spot. (G in Fig)

8. State that three objects on the ground, with well defined edges, and which can be identified on the map, should be selected.

For the best results these objects should be as far away as possible and spaced fairly equally around the point. G. (In the diagram these points are referred to as A, B and C).

9. Explain and demonstrate that the director is then laid on A with its drums and dials at zero. From A, the switches to B and C should be measured and noted. (Angles X and Y in the diagram). The same ends of the objects should be used, ie, all right ends of all left ends.

10. Practise the squad.



/RESECTING .....

RESECTING THE POSITION

11. Move the squad indoors,

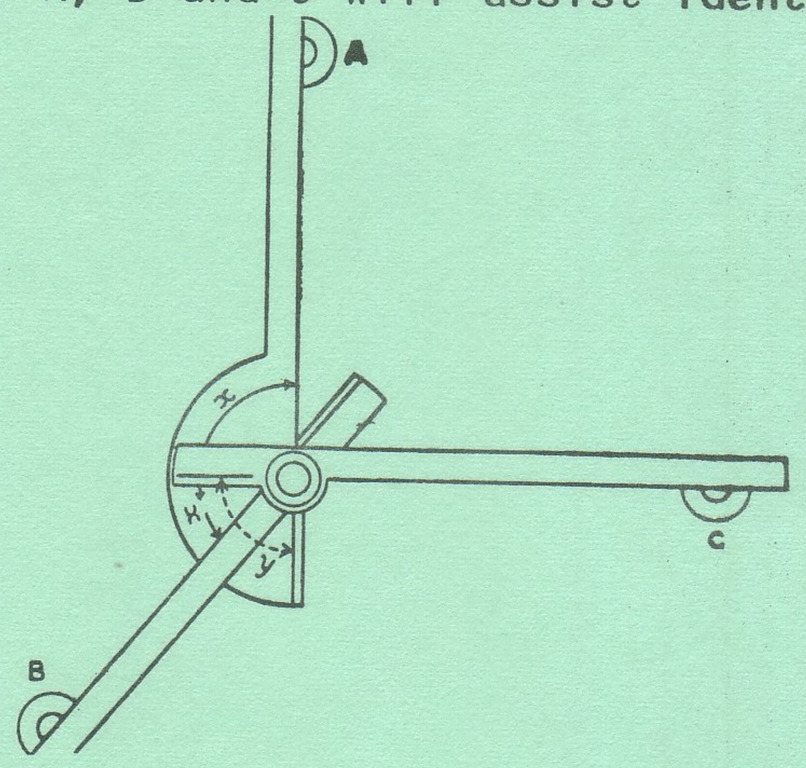
12. Explain and demonstrate how to resect a position :-

a. Take the resector and with all arms closed, hold it so that they are pointing away and release the clamping screw.

b. Move the lower pivoting arm in an anti-clockwise direction and using the inner scale of the protractor, set the bevelled edge at the angle X.

c. Move the upper pivoting arm in a clock-wise direction using the hairline on the tail and the outer scale, set the arm at the angle Y. Taking care that the arms do not move, tighten the clamping screw.

d. Lay out the map on a flat surface, removing all creases and folds. A small pencilled circle around each of the objects A, B and C will assist identification.



e. The bevelled edge of the fixed arm should be said on the left edge of A and then by moving the protractor about get the bevelled edges of the two pivoting arms over the left ends of B and C respectively as in Fig above. Care must be taken that the eye is immediately above the bevelled edges when the resector is set.

f. A sharp pencil through the hole in the clamping screw marks the position of No 1 gun. The resector is removed and the mark circled in pencil.

/g. The .....

g. The accurate map references can be measured with a romer.

13. Practise the squad in resecting a position using the data obtained outdoors.

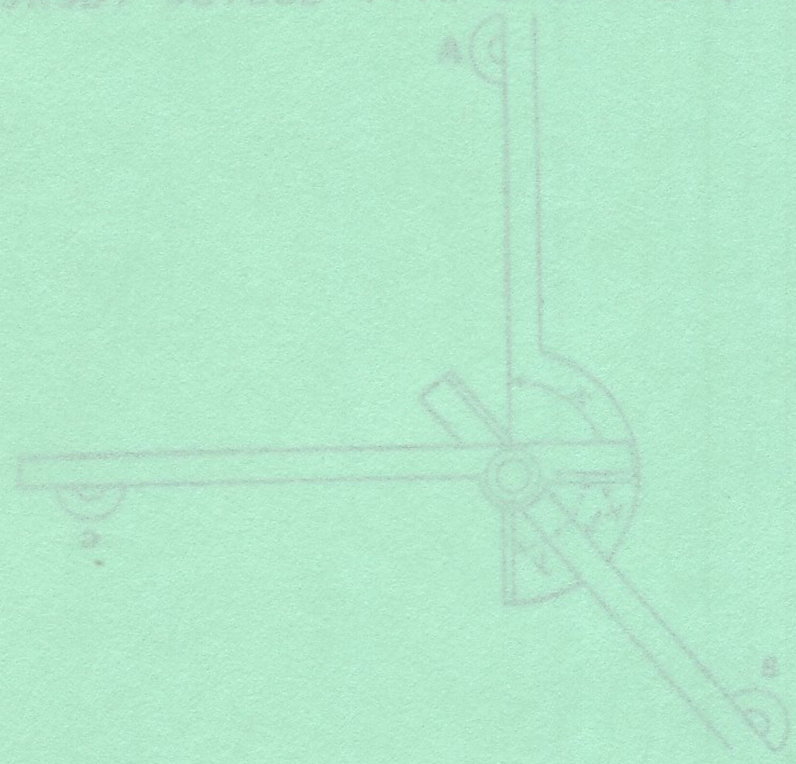
14. If time allows, practise the squad in the complete process of resecting a new pivot gun position.

SUM UP

15. Sum up the main points.

CONCLUSION

16. Questions to and from class.



/LESSON 84 .....

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LESSON 84

MAP SHOOTING, DIRECTION

A INSTRUCTOR'S NOTES

STORES

Blackboard and chalk, for lecture. The class require range tables maps, sharp pencils and tracing paper.

Practise - Director, compass, zero posts, direction pegs, gun flags and a short wooden post.

PERIODS

PREPARATION

Prepare a map shoot to be used as an example when teaching this and the ensuring lesson. The class should work out the example on their maps after each lesson.

AIM

To teach how to lay out the gun position and to obtain from the map the direction to hit the target.

B CONDUCT OF LESSON

LOCATION OF THE PIVOT GUN ON THE MAP

1. State that the position of the pivot gun can be fixed on the map by :-

   a. Resection, using one of the following methods :-

      i. Resector protractor.

      ii. Tracing paper.

      iii. Compass.

   b. By comparing the detail on the ground with the detail on the map.

   c. By artillery survey, if available.

2. Revise, by questions, resection by the resector protractor.

3. Make sure that the class understand how to resect by compass

/(See .....

(See Manual of Map Reading , Photo Reading and Field Sketching 1929).

4. Explain and demonstrate resection by tracing paper. This is done by drawing on a sheet of tracing paper three lines meeting at one point and making angles measured by the director as in the resector protractor. The three lines on the tracing paper are then used as if they were three arms of the resector protractor.

5. State that, when time permits, a greater accuracy is attained by employing one method and checking with another.

PLACING GUNS ON ZERO LINES

6. Tell the class that a zero line is selected on the map in the centre of the target area. The picot gun can be placed on this zero line by either :-

a. Use of a reference point which can be seen on the ground and located on the map, or.

b. If no suitable reference point can be found, by compass.

7. Explain how to place the pivot gun on its zero line by the use of a reference point :-

On the map, draw the lines joining the pivot gun to the point selected for its zero line. On the map, draw the line joining the pivot gun to the reference point. Measure the angle between the two lines with a protractor.

Mount a director over No 1 gun flag with its drums and dials at zero. Lay it on the reference point stil at zero, and then swing it through the angle measured. Place a zero post and a direction peg using the hairline.

8. Explain how to place the pivot gun on its zero line by compass :

On the map draw the line joining the pivot gun to the point selected for the zero line. Measure the grid bearing of the zero line with a protractor. Convert this to a magnetic bearing by adding the magnetic variation if the variation is West - by subtracting if the variation is East. Add or subtract the compass error (if any)

Place a wooden peg in the position of No 1 gun and rest the compass on this peg, rotating it until it is laid on the required bearing Align a zero post and a direction peg, using the hairline on the compass in the same way as the hairline of the director.

/9. State .....

9. State that when the guns arrive, they ate paralleled on their zero lines in the normal manner. If the guns are not coming into action until after dark, posts and pegs must be put out for all guns.

OBTAINING DIRECTION

10. Explain the method of obtaining direction, which is as follows :

Draw a line between the pivot gun and the centre of the target and measure the angle between this line and the zero line, with a protractor. Work out the switch required to lay the line of fire on No 1 gun $22\frac{1}{2}$ yards to the right of the centre of the target, in the normal manner.

11. Confirm the methods of locating the pivot gun, of placing the guns on their zero lines and obtaining direction, by questioning the class.

PRACTICAL PEGGING

12. Demonstrate pegging using a reference point.

13. Practise the squad.

14. Demonstrate pegging using a compass.

15. Practise the squad.

16. Practise the squad in resecting a position and pegging it for a night shoot.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

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LESSON 85

MAP SHOOTING - ELEVATION, CREST CLEARANCE, AND SHOOTING

A INSTRUCTOR'S NOTES

STORES

Blackboard and chalk. The class require range tables, maps marked up with the example used in Lesson , resector protractors and sharp pencils.

PERIODS

PREPARATION

Draw the diagram given below on the blackboard. Prepare two map shoots.

AIM

1. To teach how to calculate from the map the elevation required to hit the target.

2. To teach how to determine from the map whether guns will clear the crest.

3. To teach how to ensure from the map that fire can be delivered over the heads of our own troops with safety.

B CONDUCT OF LESSON

OBTAIN ELEVATION

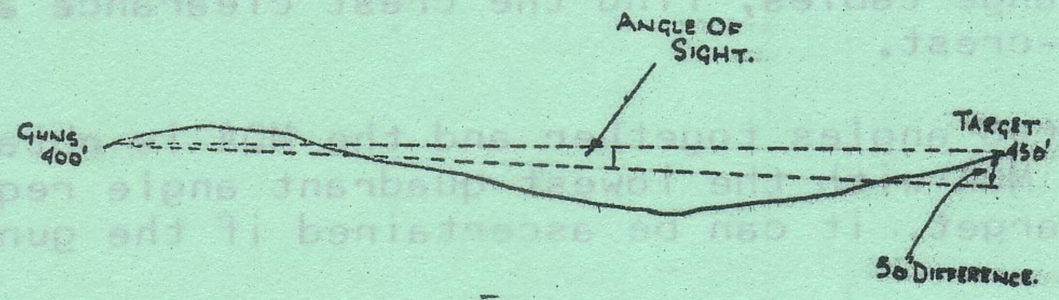
1. Explain that :-

   a. The range gun-target is obtained from the map using the scale on the resector, or dividers in conjunction with the scale at the bottom of the map.

   b. The angle of sight is obtained by determining the difference in height between the guns and the target and converting this vertical height to an angle.

   See Figure.

/THE .....



The procedure is as follows :-

i. Examine the contours and note the height of the guns and the target above sea level and thus determine the difference in height between the two, eg -

Target ... ... 450 ft
Guns ... ... 400 ft
Difference ... ... +50 ft

ii. Convert this figure to the nearest number of yards and from the VI graph discover the angle it subtends at the range gun-target, eg -

Range 2700 yards.
17 yards at 2700 yards subtends 20 minutes.
Angle of sight is plus 20 minutes.

c. Errors in elevation are covered by the combined sight rule in the normal manner.

2. Get the class to work out an elevation problem.

CREST CLEARANCE

Explain that it may be necessary to ascertain whether the bullets will clear the crest which is not visible from the gun position. The line on the map between the gun lines and the target should always be examined to see if it passes through a contour higher than the guns. If such a crest is found, the procedure is :-

a. By comparison of the contours, determine the difference in height between the crest and the guns, and measure the range guns-crest.

b. From the VI graph discover what the height of the crest above the guns subtends as an angle. This is the angle of sight to the crest.

/c. From .....

c. From the range tables, find the crest clearance angle for the range guns-crest.

d. Add these two angles together and the MQA is obtained. By comparing the MQA with the lowest quadrant angle required to engage the target, it can be ascertained if the guns will clear the crest.

Example :-

Range guns-crest	1200 yards.
Gun contour	400 ft.
Crest contour	500 ft.
Difference	100 ft.
33 yards at 1200 subtends	1°35′
Crest clearance angle at 120 yards	1°36′
MQA is	3°11′

From the previous example, the elevation to hit the target was 2700 plus 20′.

Tangent angle for 2600 yards is	5°24′
Angle of sight is	20′
Lowest quadrant angle is	5°44′

By comparing this with the MQA it can be seen that guns will clear the crest by 2°33′

3. Get the class to work out a crest clearance problem.

SAFETY

4. Explain that it may be necessary to ascertain whether the guns can be fired with safety over the heads of our own troops in the line of fire. The procedure is identical to the procedure for ascertaining if guns will clear a crest, except that the safety angle for the range guns-own troops is employed in place of the crest clearance angle for the range guns-crest.

Example :-

Range guns-own troops	850 yards
Gun contour	400 ft.
Own troops contour	640 ft.
Difference	240 ft.
80 yards at 850 yards subtends	5°20′
Safety angle at 850 yards is	1°57′
Guns must not fire lower than ,.....	7°17′

/5. Get .....

5. Get the class to work out a safety problem.

6. The class should now be practised in the whole procedure of making calculations and preparing positions for map shoots. It is advisable for the instructor to check that the class have obtained the correct data before allowing them to prepare the fire order.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from squad.

CHAPTER 15

FLANKING AND OVERHEAD FIRE

ALL SAFETY ALLOWANCES GIVEN IN THIS CHAPTER ARE THOSE ACCEPTABLE IN WAR. FOR SAFETY ALLOWANCES DURING PEACETIME TRAINING REFERENCE SHOULD BE MADE TO INFANTRY TRAINING, VOL III, PAMPHLETS Nos. 31 AND 33, AND TO PERIODICAL ACIs LAYING DOWN SAFETY LIMITS ON TRAINING.

INTRODUCTORY NOTES

GENERAL

1. The provision of supporting fire to our own troops is the main tactical role of the machine gun. The safety of the troops to be supported must be the first consideration of the machine gun commander.

FLANKING OR OVERHEAD

2. Supporting fire can be provided from the flank of a line of advance or defended locality, or by overhead fire, that is, when the trajectory passes over the heads of our own troops. Where possible, flanking fire positions should be sought; not only because of the greater fire effect usually obtained from the beaten zone is enfilade, but also because fire from a flank can be put down with safety considerably closer to the troops being supported than can overhead fire. Before the occupation of a position for the purpose of overhead fire, it is necessary to determine that such fire will be safe to our own troops. This increases the time required for the guns to be brought into action.

POSITION OF OWN TROOPS

5. In order that the safety of the troops may be ensured, it is essential that their position or movements should be observed by or known to the fire controller. Im defence, such observation or knowledge should not present any serious difficulty. In attack, the possibility of observing the movements of our own troops will depend on various factors, eg, the nature volume ground(whether open, close, flat, hilly) and obstructions to be field of view, (Bad visibility, smoke screen, etc.) Since such observation can hardly be assured, it is evident that considerable caution will have to be exercised.

4. Apart from the above considerations, the machine gun, by reason of its stable mounting and the close grouping of its fire, is well suited to carry out flanking or overhead fire with safety to our own troops.

/RULES .....

RULES OF SAFETY

5. Flanking and overhead fire are governed by definite rules, which are contained in the following Lessons. Thes rules take into account unarmoured troops in the open. If our own troops are dug in, commonsense will indicate to what extent these rules can be relaxed. For instance, it may be safe to fire just over the top of the trench 200 yards in front of the guns. But at longer ranges, the risk of dropping bullets at a steep angle of descent into our weapon pits must be considered. Tanks are immune from machine gun fire, and fire may be put down close ahead of, or even among, friendly tanks.

6. On occasions it may be unsafe to engage a target if the fire control rules are complied with. It may however, be possible to fire on the target by modifying the fire control rules, by reducing either the number of taps or the number of elevations.

LESSON 36

FLANKING FIRE

A INSTRUCTOR'S NOTES

STORES

Lecture - Blackboard and chalk.
Practise - Two directors and portable blackboard.
Class require range tables and binoculars.

PERIODS

PREPARATION

Lecture - Draw the diagrams given on the blackboard.
Practice - The instructor should select targets and positions of own troops and prepare problems before the lesson begins.

INTRODUCTION TO LESSON

State that flanking fire may be of two types :-

a. Engaging a target towards which our own troops are advancing until it is no longer safe to fire.

b. Laying a belt of protective fire as close in front of an infantry locality as is consistent with safety.

AIM

1. To teach the rules of flanking safety.

2. To teach how to give the maximum possible support withs safety to our own troops when advancing in the attack.

B CONDUCT OF LESSON

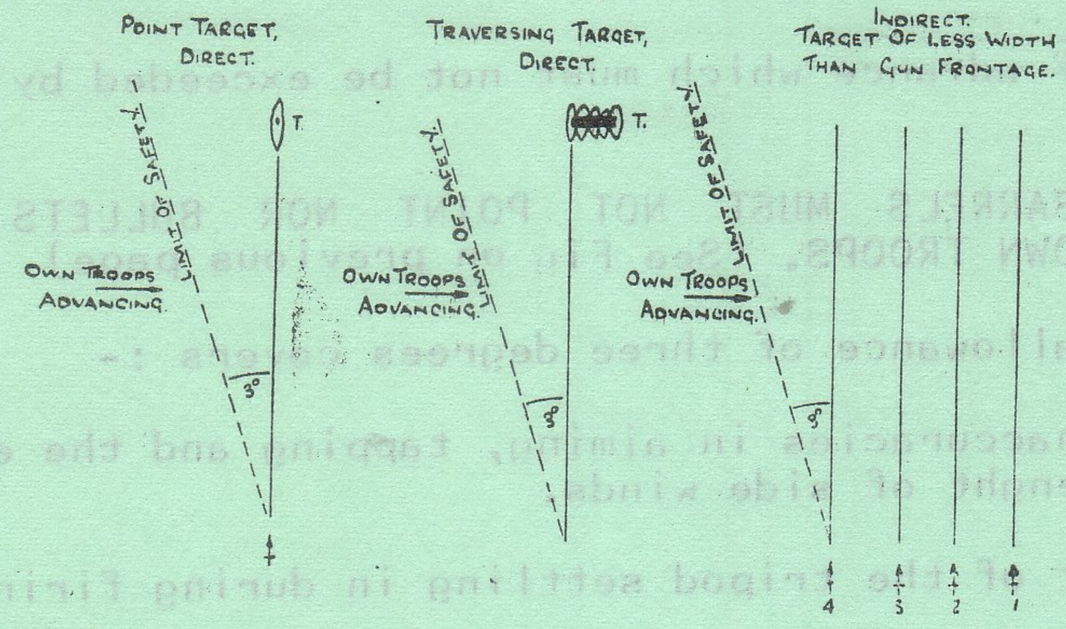
RULES

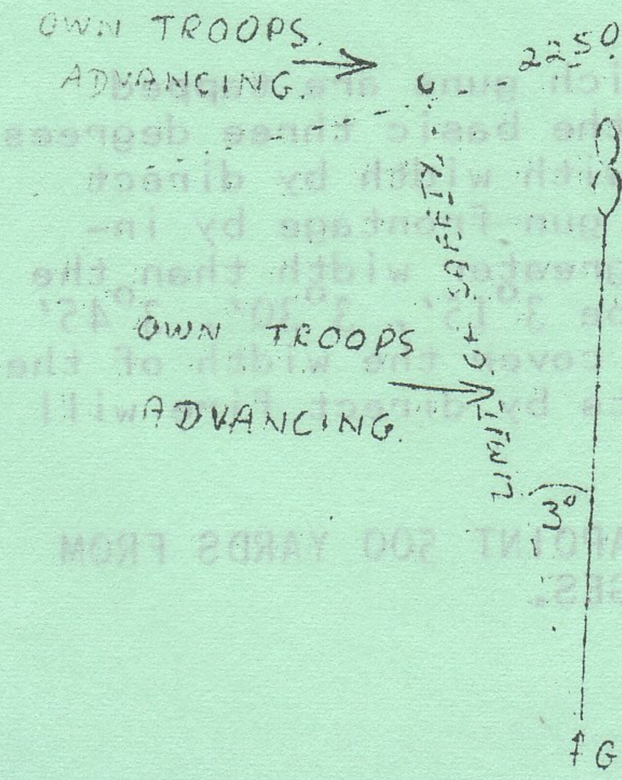
1. Tell the class that flanking fire is covered by six main rules which are stated and explained below.

2. RULE ONE - THE POSITION OF OWN TROOPS MUST BE KNOWN OR THEY MUST BE WORKING TO A TIMED PROGRAMME.

This entailt the observation of our own troops during the whole time that the guns are firing or the application of a timed programme

/based .....





EXAMPLE.

TARGET — 1800 YDS (R/F).

HIGHEST ELEVATION — 1850yds.

3° LIMIT EXTENDS TO 2250 yds.

based on a rate of advance which must not be exceeded by the infantry units concerned.

3. RULE TWO - BARRELS MUST NOT POINT NOR BULLETS FALL WITHIN THREE DEGREES OF OWN TROOPS. (See Fig on previous page)

The lateral allowance of three degrees covers :-

a. Minor inaccuracies in aiming, tapping and the estimation of the strenght of side winds.

b. Movement of the tripod settling in during firing.

c. Half the width of the beaten zone.

When engaging a target the allowance of three degrees must be measured from the edge of the target nearest to own troops. The only exception to this rule is in indirect fire, when engaging a target of less width than the gun frontage, the allowance is measured from the point on which the line of fire of the gun nearest to own troops will fall.

Fire must cease when own troop reach the three degrees limit of safety.

4. RULE THREE - GUNS MUST NOT BE TAPPED WITHING THE THREE DEGREE LIMIT.

This rule implies that the angle through which guns are tapped outside the edge of the target must be added to the basic three degrees allowance. The allowance when engaging targets with width by direct fire and targets of equal or less width than the gun frontage by indirect fire is $3^{o}15'$. When engaging targets of greater width than the gun frontage by indirect fir the allowance will be $3^{o}15'$, $3^{o}30'$, $3^{o}45'$ or 4° depending on the number of taps required to cover the width of the target. The allowance when engaging point targets by direct fire will be $3^{o}30'$.

5. RULE FOUR - THE 3 DEGREE LIMIT EXTENDS TO APOINT 500 YARDS FROM THE CENTRE OF THE HIGHEST BEATEN ZONE AT ALL RANGES.

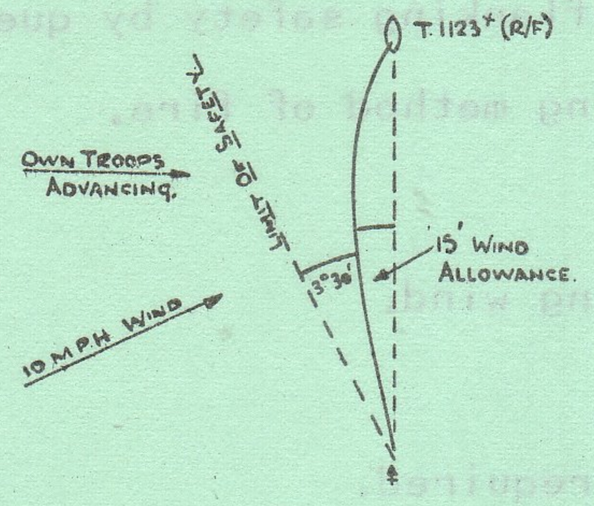
/RULE .....

6. RULE FIVE - CAREFUL ALLOWANCE MUST BE MADE FOR WIND.

If, when laying guns to engage a target, they are tapped, switched or elevated towards our own troops, the amount that they are tapped, switched or elevated must be added to the safety allowance (See examples below).

EXAMPLE 1

Guns are engaging a point target with own troops approaching from the left. A wind is blowing from 3 o'clock at 10 mph.



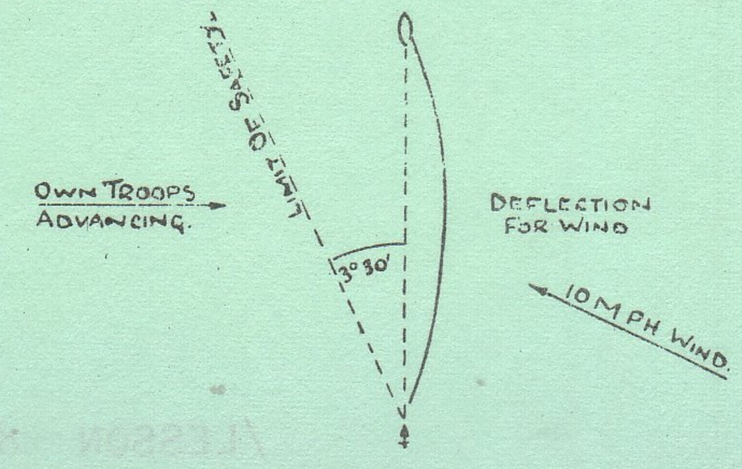
To hit the target, the gun must be tapped to the left one tap (8 o'clock wind at 10 mph requires 13 minutes allowance). This will bring it closer to our own troops. The safety allowance must therefore be :-

Basic angle	3°
Method of fire	30′
Wind allowance	15′
Total allowance	3°45′

Fire must cease when troops are 3°45′ from the target.

EXAMPLE 2

In the previous example, if the wind had been blowing from the right no extra allowance for wind would have been required.



/To hit .....

To hit the target, the gun would have to be tapped to the right and away from our own troops. There would be therefore no necessity for increasing the allowance of $3^{o}30'$.

7. RULE SIX - THE SAFETY ALLOWANCE MUST BE MEASURED BY ACCURATE MEANS.

The safety allowance must NOT be measured by hand angles.

PRACTICE

8. Revise the rules of flanking safety by questions.

9. Set problems involving method of fire.

10. Discuss problems.

11. Set problems involving wind.

12. Discuss problems.

13. Further problems as required.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

/LESSON 87.....

LESSON 87

OVERHEAD FIRE DIRECT

A INSTRUCTOR'S NOTES

STORES

Blackboard, chalk, gun and tripod, for lecture.
Two directors, gun and tripod and portable blackboard, for practice.
Class require range tables and binoculars.

PERIOD

PREPARATION

Lecture - Draw the diagrams given below on the blackboard.
Practice- The instructor should select targets and positions of own troops and prepare problems.

AIM

To teach the rules of overhead safety.

To teach how to give with safety the maximum possible support by overhead fire to our own troops advancing im the attack.

B CONDUCT OF LESSON

APPROACH

1. Give the aim of the lesson (See para 1 and 2 above).

RULES

2. State the rules for overhead fire :-

a. RULE ONE - THE POSITION OF OWN TROOPS MUST BE KNOWN OR THEY MUST BE WORKING TO A TIMED PROGRAMME.

b. RULE TWO - TRIPODS MUST BE IN GOOD CONDITION AND BARRELS MUST NOT HAVE FIRED MORE THAN 12000 ROUNDS.

c. RULE THREE - THE RANGE TO OWN TROOPS MUST NOT EXEED 2400 YARDS.

d. RULE FOUR - THE RANGE TO OWN TROOPS MUST NOT BE FOUND BY RANGEFINDER OR MAP OF SCALE NOT LESS THAN 1/25,000,

/e. RULE .....

e. RULE FIVE - THE LOWEST TANGENT ANGLE TO ENGAGE THE TARGET MUST BE EQUAL TO OR GREATER THAN THE SAFETY ANGLE TO OWN TROOPS PLUS OR MINUS THE GROUND ANGLE.

f. RULE SIX - CAREFUL ALLOWANCE MUST BE MADE FOR WIND.

g. RULE SEVEN - THE GROUND ANGLE MUST BE MEASURED BY BINOCULARS, DIAL SIGHT OR OTHER ACCURATE MEANS.

THEORY

3. Explain :-

a. The safety angle :- For overhead fire to be carried out with safety, bullets must pass over the heads of own troops at certain minimum heights dependent on the range to own troops. These minimum heights can be expressed as angles and are called safety angles. Safety angles for all distances of own troops from the guns can be found in the range tables.

The safety angle allows for :-

i. Permissible errors in rangetaking.

ii. Errors in estimating the strength of the wind.

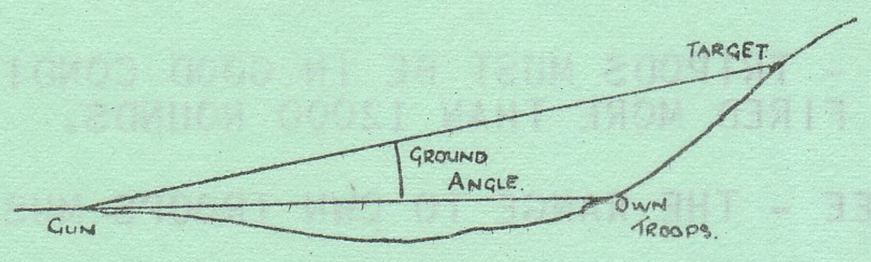
iii. Errors in laying and sighting.

iv. Movement of the tripod settling in during firing.

v. Depth of the lowest shot below the centre of the cone of fire.

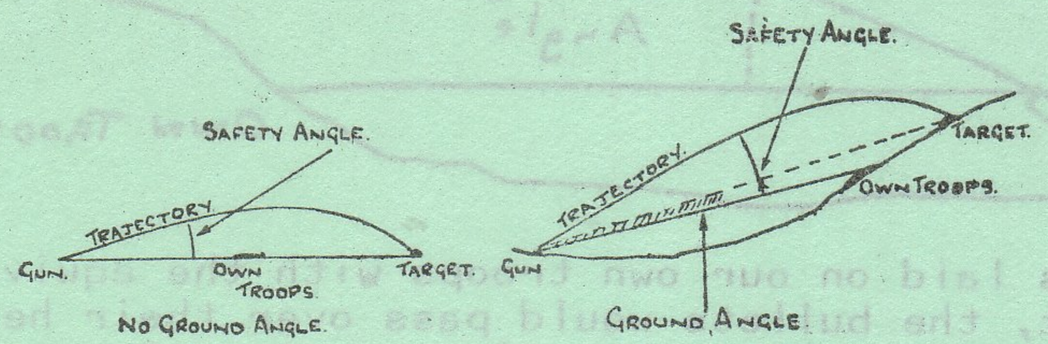
vi. The height of a lorry.

b. The ground angle :- The ground angle is the angle between the line of sight to own troops and the line of sight to the target (See Fig below).



/The .....

The greater the ground angle, the closer can fire be laid to own troops.
This is clearly shown in Fig below.



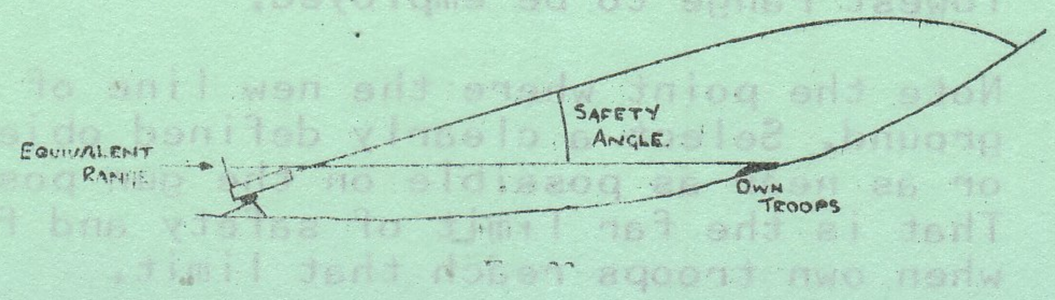
c. Near and far limits of safety - When troops are advancing through the gun position to the target, under overhead fire, there must be a point after they have passed the gun position at which they are safe and a point nearer the target at which they again become unsafe.. These points are called the near and the far limits of safety (See fig below).



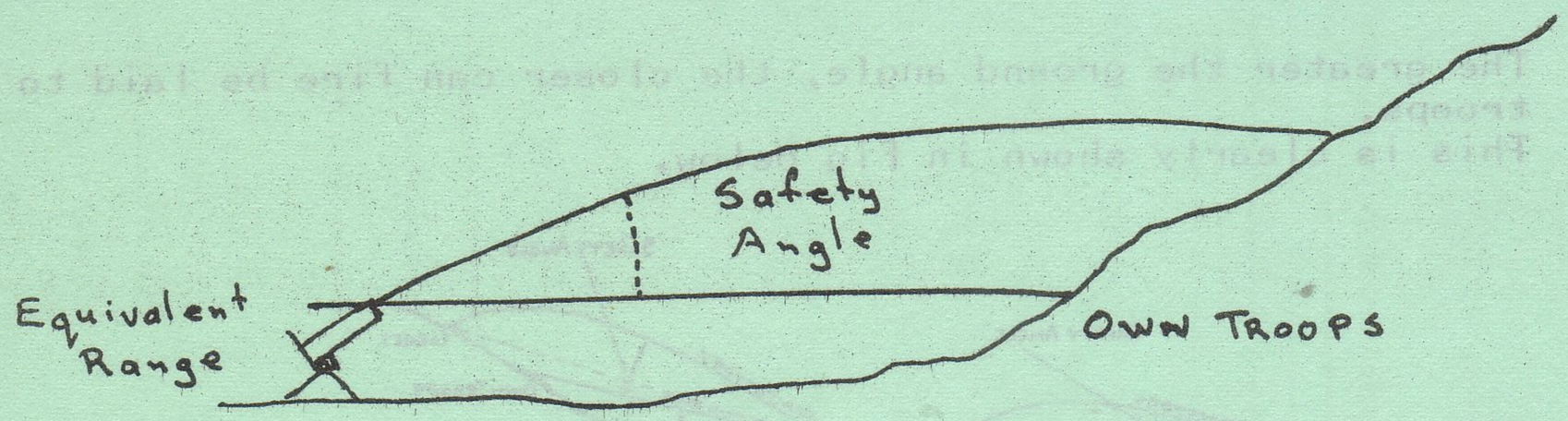
d. The equivalent range - The safety angle, which is in effect the angle between the line of sight to own troops and the trajectory giving minimum safety to own troops, is a form of tangent angle. Like a tangent angle, it can be expressed as a range.

This is called the equivalent range (See Fig below).

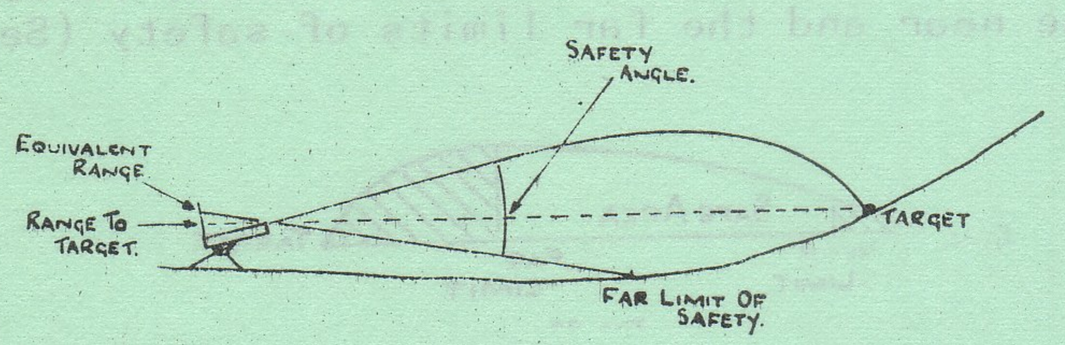
Equivalent ranges for all distances of own troops from the guns are given in the range tables.



/If .....



If a gun was laid on our own troops with the equivalent range on the tangent sight, the bullets would pass over their heads with the minimum clearance required by the safety angle. Conversely, if a gun was laid on a target with the range to the target on the tangent sight the slide on the tangent sight could be moved up to the target. The line of sight through the sights would then meet the ground at a point at which own troops would be safe. This would be the far limit of safety (See Fig below).



PROCEDURE

4. Describe how to determin the far limit of safety :-

The fire controller can employ either of the following methods

a. The tangent sight method :-

i. Lay the gun on the target with the lowest range that may be employed.

ii. Without disturbing the laying of the gun, set the slide on the tangent sight at the equivalent range for the lowest range to be employed.

iii. Note the point where the new line of sight meets the ground. Select a clearly defined object at that point or as near as possible on the gun position side of it. That is the far limit of safety and fire must cease when own troops reach that limit.

/iv. Move .....

iv. Move the sight back and check that the laying of the gun has not been disturbed.

The tangent sight method is the simpler and should be employed when the section commander has access to one of his guns. This method cannot be used on flat ground, when the target and far limit are on the same line of sight.

b. <u>The comparison of angles method</u> :-

i. From the range tables, to obtain the tangent angle for the lowest range to be employed to engage the target.

ii. By eye, select a point which appears to be about the far limit of safety. Obtain the range to that point and look up its safety angle in the range tables.

iii. Measure the ground angle and subtract it from the safety angle. Compare the result with the lowest tangent angle to be used. If it is equal to or slightly less than the lowest tangent angle, then you have found the far limit of safety.

iv. If it is greater than the lowest tangent angle, another point should be selected nearer the gun line and the process repeated until the far limit is found.

The comparison of angles method can be used on all occasions on which overhead fire is to be employed.

<u>Example</u> :-

The point selected as the probable for limit of safety is at a range of 1215 yards and the ground angle to that point is 30 minutes.

Range to target 1650 yards (Estimation); lowest elevation 1550 yards.

Tangent angle for 1550 yards is $2^{\circ}25''$

Safety angle for 1250 yards is $2^{\circ}54''$

Therefore the safety angle minus the ground angle equals $2^{\circ}24''$.

As this angle is one minute less than the lowest tangent angle, friendly forces are safe at this point, which is therefore the far limit of safety.

/4. To determine .....

A head wind would have to be offset by raising the elevation on the guns. Our own troops would not be endangered. The far limit of safety must not, however, be moved further away from the guns, as our own troops might be endangered.

8. The procedure for catering for head and rear winds is therefore as follows :-

a. Tangent sight method - The act of depressing the gun, by means of the handwheel, to offset a rear wind automatically brings the far limit nearer to the guns. When catering for a head wind, it would also move the far limit further from the guns. This must not take place. Therefore,

Rear wind - Use the equivalent range for the lowest range to be employed after wind corrections.

Head wind - Use the equivalent range for the lowest range to be employed. Do not correct for wind until after the limit has been selected.

b. Comparison of angles method - As the calculations to determine the far limit are carried out by the fire controller mathematically, and not manually at the gun, the allowance for a rear wind must be made by the fire controller himself in determining the far limit of safety. Therefore,

Rear wind - Compare the lowest tangent angle to be employed after wind correction with the safety angle plus or minus the ground angle.

Head wind - Compare the lowest tangent angle to be employed with safety angle plus or minus the ground angle. Do not make any allowance for wind when determining the far limit safety.

PRACTICE

9. Revise the rules of overhead safety.

10. Explain and demonstrate the method of obtaining the far limit of safety by the tangent sight method.

11. Practise the class.

12. Revise the method of obtaining the far limit of safety by the comparison of angles method.

13. Practise the class in problems.

/14. Revise .....

14. Revise the method of obtaining the near limit of safety.

15. Practise the class in problems.

16. Practice the class in all types of overhead fire problems including wind.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the squad.

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LESSON 88

OVERHEAD FIRE - INDIRECT

A INSTRUCTOR'S NOTES

STORES

Lecture - Blackboard and chalk.
Practice - Two directors and portable blackboard.
Class require range tables.

PERIODS

PREPARATION

Practice - The instructor should select targets and positions of own troops and prepare problems before the lesson begins.

AIM

To teach the method of giving overhead fire from an indirect fire position.

B CONDUCT OF LESSON

RULES

1. State that the rules for overhead fire - direct apply equally to indirect fire.

FAR LIMIT

2. Tell the class that the far limit of safety is obtained by the comparison of angles method.

For practical purposes the angle of sight to the target and the ground angle to own troops as measured from the OP will be considered the same as from the gun position, provided the OP is not more than 12 feet above the gun position.

NEAR LIMIT

3. Explain that the near limit of safety is obtained as follows :-

a. If the gun line is close to the crest, the near limit of safety is a point immediately beyond the crest behind which the guns are positioned, at which troops cannot be seen from

/the gun .....

the gun position. This point can be determined from the gun position by eye.

b. If the guns are well back from a shallow crest, the near limit may be on the same side of the crest. In this case the near limit can be obtained by the comparison of angle method. As no ground angle can be measured direct, the angle of sight to own troops must be considered in relation to the angle of sight to the target.

Examples :- If the angle of sight to the target is greater than the angle of sight to own troops, the difference between them must be subtracted from the safety angle as in normal direct fire.

If the angle of sight to the target is a plus angle of sight, but less than the angle of sight to own troops, the difference between them must be added to the safety angle.

If the angle of sight to the target is a minus angle, the difference between that angle and the angle of sight to own troops must again be added to the safety angle.

PROTECTIVE FIRE

4. The procedure for laying protective fire, from an indirect position, as close to own troops as possible is as follows :-

a. Obtain the range and angle of sight to own troops.

b. Find from the range tables the equivalent range to own troops.

c. Lay the guns by indirect means for direction on own troops.

d. For elevation, order the equivalent range and the angle of sight to own troops. Fire can thus be laid as close as possible to own troops, consistent with safety.

WINDS

5. Head and rear winds will have the same effect as in direct fire. Therefore, :-

a. When engaging a target,

For head winds, no allowance is necessary.
For rear winds, allowance must be made

/b. When .....

b. When laying down protective fire,

For head winds, allowance must be made.
For rear winds, no allowance is necessary.

PRACTICE

6. Practise class in far limits problems.

7. Point out a near limit, with guns close to crest.

8. Practise the class in near limit problems when the guns are well back from the crest.

9. Practise the class in protective fire problems.

10, Practise the class in problems involving wind.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the class.

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LESSON 89

LAYING A FIXED LINE (FLANKING FIRE)

A INSTRUCTOR'S NOTES

STORES

Lecture - Blackboard and chalk.
Practice - Gun, tripod, dial sight, belt with drill cartridges and aiming posts.
Class require range tables.

PERIODS

PREPARATION

Draw the diagrams given below on the blackboard.

INTRODUCTION TO LESSON

Show the class that fixed lines, flanking fire, may take either of two forms :-

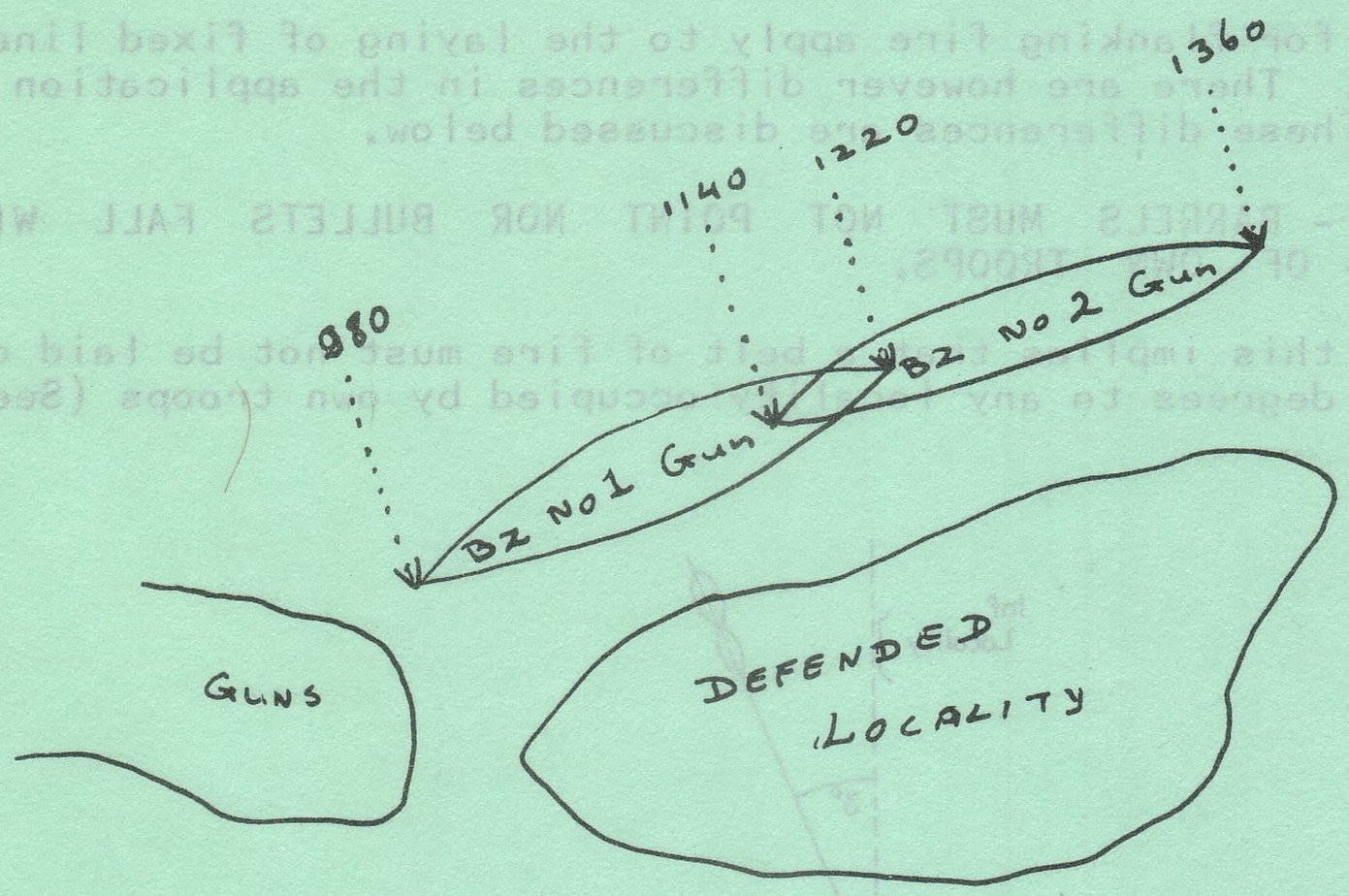
a. i. A belt of fire where safety is involved. In this case, it is usual to give different ranges to each gun so as to make the belt of fire as long as possible. To ensure that there is an efficient overlap of beaten zones on flat ground and forward slopes, the amount by which the ranges can be opened out is given in the following table :-

Forward Slope	Open out			
	Nil	50^x	100^x	150^x
Flat ground	-	-	1300	600
30^n 1/115	-	-	2000	1250
1° 1/60	-	-	600 - 800 1350 - 200	850 - 1300

/2° 1/30 .....

Forward Slope	Open out			
	Nil	50[x]	100[x]	150[x]
2° 1/30	-	600	1150	-
3° 1/20	-	-	-	-
	-	1100	2000	-
4° and Over	600	1050	-	-
1/15 and Over ...	1000	2000	-	-

ii. An example of this can be seen in Fig below, where by ordering "No 1 gun 1100 yards, No 2 gun 1250 yards", on flat ground the belt of fire can be stretched from 980 yards to 1360 yards and the beaten zones will overlap efficiently. This is one of the most valuable characteristics of the MMG. When laying a belt of fire, tapping right and left is not employed.



/b. At .....

b. At times it may be necessary to lay a fixed line on a bridge, crossroads, narrow valley or some other place where the enemy is likely to concentrate, In such circumstances and where safety is involved, it may be necessary to tap right and left in order to cover the whole width of the point to be engaged.

c. Instructors Note. It may appear that on flat ground the amount of overlap allowed when the beaten zones are "opened out" is excessive; this is because when preparing the rule for flat ground in para 7 a above, only 78 percent of the lenght of the beaten zones was used in order to ensure an efficient overlap and belt of fire. However, for all other purposes, the dimensions of the beaten zones shown in the range-tables should be used.

AIM

1. To teach how to lay a fixed line as near as is safe to a defended locality by flanking fire.

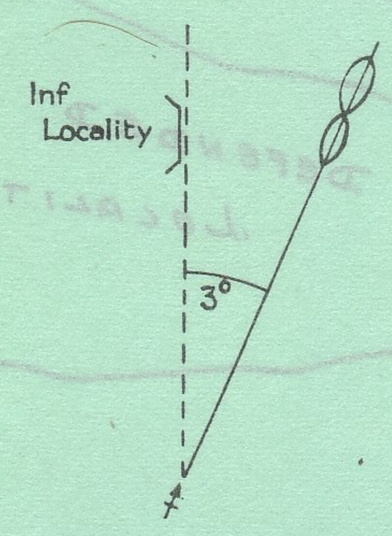
B CONDUCT OF LESSON

RULES

1. The rules for flanking fire apply to the laying of fixed lines, flanking, fire. There are however differences in the application of these rules. These differences are discussed below.

2. RULE TWO - BARRELS MUST NOT POINT NOR BULLETS FALL WITHIN THREE DEGREES OF OWN TROOPS.

Show that this implies that a belt of fire must not be laid closer that three degrees to any locality occupied by own troops (See Fig below).



/3. RULE .....

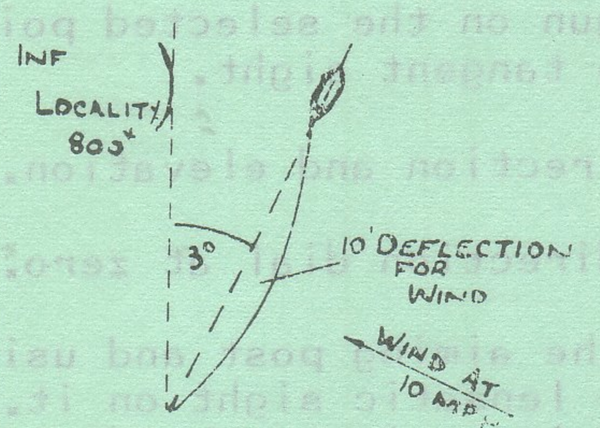
3. RULE FIVE - CAREFUL ALLOWANCE MUST BE MADE FOR WIND.

Explain :-

If, when laying a belt of fire in front of own troops, the wind tends to blow the bullets within the three degree limit, the guns must be switched away from own troops.

Example 1 :-

Guns are required to lay a belt of fire in front of an infantry locality. A wind is blowing from 4 o'clock at 10 mph.



If the guns were laid only 3° from the locality, the wind would blow the bullets inside the 3° limit by 10'. The guns must therefore be switched 10' to the right.

Example 2 :-

If, in the previous example the wind had been blowing from the left, ie, away from our own troops, the guns should be laid 3° from the locality. They could not be laid closer to the locality as, if the wind suddenly dropped, the bullets would fall within the 3° limit.

PROCEDURE

4. Explain the procedure in laying a gun on a fixed line as near as is safe to a defended locality.

a. To lay the gun for direction.

i. The safety allowance required is 3°.

ii. Set this angle on the deflection drum, and using the lensatic sight, lay on the front edge of the defended locality.

/b. To lay .....

b. To lay the gun for elevation.

i. By running the tangent sight up and down, find the limit of flanking safety.

ii. Select a point either on or outside this line in the area where the group commander has ordered the fixed line to fall.

iii. Obtain the range to this point. Decide on the elevation to be given to each gun so that the fixed line will be as long as possible without there being gaps between the beaten zones.

iv. Lay the gun on the selected point with the necessary range on the tangent sight.

c. To maintain direction and elevation.

i. Set the direction dial at zero.

ii. Put out the aiming post and using the deflection drums, align the lensatic sight on it. Rcord the angle measured and leave it on the dial sight.

iii. Record on paper the quadrant elevation and the angle on the deflection drums. Place the paper in the dial sight box for safe keeping.

d. Half load and press the thumb-piece.

e. Any wind problem affecting the safety of own troops must be born in mind, and before firing on the fixed line the necessary wind allowance must be made, using the deflection drums, and re-laying the guns on the aming post.

f. When using more than one gun, the gun farthest from the defended locality will be used for determining the points about which the fixed lines will fall.

PRACTICE

5. Explain and demonstrate with the gun, alying a fixed line.

6. Practise the squad in working out problems and laying fixed lines.

7. Demonstrate that after arrangements have been made to lay the gun

/on a fixed line .....

on a fixed line, the gun, if required, can fire on other targets and yet be placed back on the fixed line when necessary.

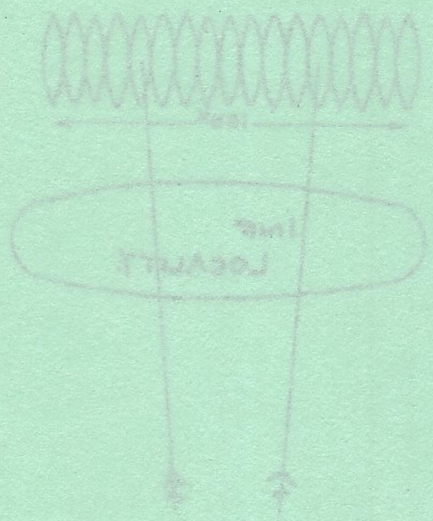
8. Further practice in fixed line problems, including wind problems.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from class.



/LESSON 90.....

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LESSON 90

LAYING A FIXED LINE, OVERHEAD FIRE

A INSTRUCTOR'S NOTES

STORES

Lecture - Blackboard and chalk.
Practice - Gun, tripod, dial sight, belt with drill cartridges and aiming post.
Class require range tables.

PERIODS

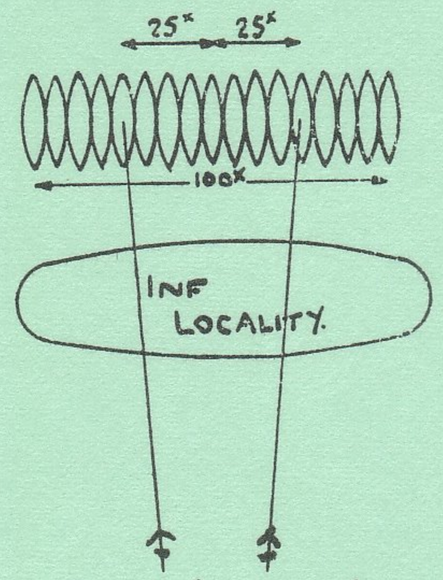
PREPARATION

Draw the diagram given below on the blackboard.

AIM

1. To teach how to lay a fixed line as near as is safe to a defended locality by overhead fire.

B CONDUCT OF LESSON



1. State that there may be occasions when it is desired to lay a mat of fire over the heads of own troops. In this case, the guns are laid a certain distance apart, normally 50 yards. Arrangements are made to tap the guns right and left so that the width of the mat is 100 yards (See Fig above).

RULES

2. Tell the class that the rules for overhead fire apply to the laying of fixed lines, overhead fire.

/PROCEDURE .....

PROCEDURE

3. Describe the procedure for laying a gun on a fixed line (overhead fire) as near as is safe to a defended locality:-

a. Obtain the range to the defended locality, and from the range tables obtain the equivalent range. Convert 25 yards at the equivalent range to an angle by means of the VI graph. Bring this angle to the nearest number of taps, if it does not come to an exact number, take it to the next highest.

b. To lay the guns for direction.

i. Set the angle obtained above on the deflection drum of the dial sight of No 1 gun as right and of No 2 gun as left.

ii. Lay both guns by means of the lensatic sight on the centre of the defended locality. The direction of No 1 gun is now 25 yards to the right of centre and of No 2 gun 25 yards to the left of centre.

c. To lay the guns for elevation.

Set the equivalent range on the tangent sight and lay the guns on the defended locality.

d. To maintain direction and elevation.

i. Put out the aiming post. Using the deflection drums, align the lensatic sight on it. Zero the tripod direction dial.

ii. Record the quadrant elevation.

iii. Note on paper the QE, the angle on the deflection drum and the number of taps right and left. Place the paper in the dial sight box for safekeeping.

e. Half load and press the thumb - piece.

f. Any wind problem affecting the safety of own troops must be calculated on the equivalent range. Before firing on the fixed line the necessary wind allowance must be made, using the range drum and relaying the gun.

/WINDS .....

WINDS

4. Explain that head and rear winds will affect the laying of overhead fixed lines as follows ;-

a. Head winds will tend to slow up the bullet and cause it to drop below the safety angle. The equivalent range will therefore have to be increased accordingly.

b. Rear winds will entail no adjustment to the equivalent range.

PRACTICE

5. Revise the squad in the method of opening up the lines of fire to 50 yards apart and of calculating the number of taps required.

6. Revise the equivalent range.

7. Demonstrate the laying of a fixed line.

8. Practise the squad in calculating and laying a fixed line.

9. Demonstrate that, after arrangements have been made to lay guns on fixed lines, the guns can if required engage targets within the arc and yet be placed back on fixed lines if necessary.

10. Further practice, including wind problems.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the class.

/LESSON 91 .....

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LESSON 91

LAYING A FIXED LINE WHEN NO DAYLIGHT RECONNAISSANCE HAS BEEN POSSIBLE

A INSTRUCTOR'S NOTES

PERIODS

AIM

1. To teach the method of laying a fixed line by night when it has not been possible to make preparations in daylight.

B CONDUCT OF LESSON

APPROACH

1. Give the aim of the lesson (See para 1 above).

2. State that it may sometimes be required to lay a fixed line to protect a locality by night when no daylight reconnaissance or preparation has been possible. Such an occasion might arise after a night attack when machine guns are required to assist in re-organization. This may be carried out by either of the following methods dependent on the circumstances :-

METHOD 1

When no safety is involved and a light can be shown from the place at which the fire is required to fall, the following procedure will be adopted :-

a. Shine a light from the area in which the fixed line has to fall.

b. Obtain the range to the light by rangefinder.

c. Lay the guns on the light, using the tangent sight set at the range obtained.

d. Record the QA, and the angle between the line of fire and the aiming lamp and continue as in Lesson

METHOD 2

When flanking safety is involved and a light can be shown from the

/front .....

front edge of the defended locality to be protected, then the following method can be adopted :-

a. Shine a light from the front edge of the locality.

b. Obtain the range to the light by rangefinder.

c. Using the tangent sight set at the range obtained, lay the guns on the light.

d. Set the deflection drums of the dial sight at the safety allowance and tap the guns until the lensatic sights are laid on the light.

e. Record the QA.

f. Set the dials of the tripods at zero. Put out the aiming lamp and, using the deflection drums, align the lensatic sight on it.

g. Note the elevation and the angle measured. Half load and press the thumb-piece.

NOTE :- This method must NOT be used for OVERHEAD fire.

SUM UP

Sum up the main points.

CONCLUSION

Questions to and from the class.

/CHAPTER 16 .....

CHAPTER 16

INTRUMENT TESTS

TESTING THE CLINOMETER

TESTING THE CLINOMETER

1. Explain and demonstrate that the clinometer is set at zero. It is then placed on the gun with the arrow pointing to the front of the gun and the bubble levelled with the handwheel. The clinometer is now reversed and the position of the bubble noted. If it is central the clinometer is in adjustment. This should, however, be confirmed by repeating the process with the clinometer set at 10 degrees depression. State that if the bubble is displaced in either test, it indicates that there is an error.

2. Demonstrate that if there is an error, the clinometer is left on the gun and the micrometer head is rotated until the bubble is central and the scale reading noted. This reading should now be halved and set on the scale, eg, if the scale had read 20 minutes elevation, it should be set at 10 minutes elevation. The clinometer should now be placed back on the gun and retested as before. If the bubble is still not central, it should again be brought central by the means of the micrometer head and then the reading should be halved as before and the clinometer tested again until the reading is obtained at which the bubble is central with the clinometer facing in both directions. This reading is the amount by which the clinometer is out of adjustment.

3. Emphasize that any adjustment must be carried out by an armourer.

4. Practise the squad.

TESTING AND ADJUSTING THE DIAL SIGHT

APPROACH

1. Dial sights should be tested periodically for both elevation and direction. Whenever a new dial sight or gun is received, the dial sight should be tested.

TESTING FOR ELEVATION

2. State that a clinometer Vickers is required. This must first be tested for accuracy.

3. Demonstrate that the clinometer scale is set as zero, or, if out of adjustment, at the error discovered when tested. The dial sight

/is placed .....

is placed on the gun and clamped up; its drum and dials set at zero. The rear cover is then opened and the clinometer placed on the breech casing with the arrow pointing to the front of the gun. The gun is then elevated or depressed by the handwheel until the clinometer bubble is central. If the dial sight bubble is then level, the dial sight is in adjustment for the gun used. If it is not central, it should be brought so by the angle of sight drum. The dial sight is thus out of adjustment by plus or minus the amount shown on the angle of sight drum.

4. State that any error must be corrected by an armourer. Practise the squad in the drill of testing for elevation.

5. Tell the squad that if it is not possible to have the dial sight adjusted before firing, a label should be attached to it showing the amount of error. The amount of error now becomes the zero mark for this dial sight, eg, if the amount of error was plus 30 minutes the dial sight would only be at 'zero' when the bubble was central plus 30 minutes on the angle of sight drum. Corrections would now be put on as normal from this new 'zero' mark.

6. Question the squad on off-setting in a dial sight which is out of adjustment.

TESTING FOR DIRECTION

7. State that the lensatic sight should be zeroed for line on the thirty yards range at the same time as the lateral adjustment of the foresight is carried out.

8. Using a blackboard, explain that a thick line is drawn parallel to and 3.4 inches to the left of the thin line on which the shots would fall. If when the MPI of the group fired, falls on the thin line, tip of the lensatic sight coincides with the thick line, the lensatic sight is in adjustment.

9. Tell the squad that as an alternative test without firing, the gun can be laid on a distant target with the tangent sight. Then if the lensatic sight also coincides with the target, it is in adjustment.

10. Demonstrate how to adjust the lensatic sight for direction. The screws below and to the side of the ramps are loosened. The appropriate screw is then tightened until the line of sight in 3.4 inches to the left of the barrel. The screw is then locked in position by tightening the opposite screw.

11. Question the squad on the method of testing and adjusting for direction. Opportunity can be taken to practise when firing on the 30-yards range.

/TESTING .....

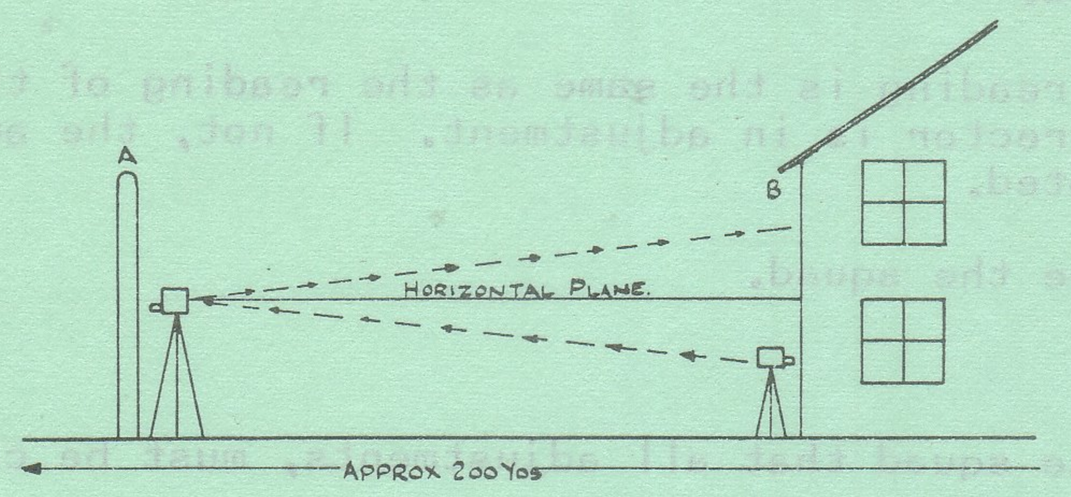
TESTING THE DIRECTOR

APPROACH

1. There are two methods of ascertaining if the director is in adjustment for measuring angles of sight - one which can be used in barracks or billets and one which can be used under active service conditions.

METHOD 1

2. Tell the squad that this method entails laying out a horizontal plane. A position must be chosen where there are two walls or upright posts about 200 yards apart and on fairly level ground. In the diagram below, the post A and the wall B have been chosen.



3. Demonstrate that the director is erected near the wall B snd laid on the post A. With both bubbles level, a mark with chalk is made on the wall B level with the object glass. Instruct an assistant to make a mark on the post A where the zero line of the angle sight cuts it.

Now move the director to the post A and erect it so that the object glass is level with the mark made by the assistant. With both bubbles level lay it on the wall B and get an assistant to make a mark in the wll where the zero line cuts it. Unless the director being used is in adjustment, there will now be two chalk marks on the wall B. Make a third mark halfway between the first two. The line from the mark on the post A to the centre mark on the wall B will be horizontal.

4. Tell the squad that any director can now be tested against this horizontal plane by placing it on one end of the horizontal plane and measureing the angle of sight to the other. The angle of sight is the amount of error in that director.

5. Practise the squad in setting up a horizontal plane and testing

/directors .....

directors.

5. Practise the squad in setting up a horizontal plane and testing directors and question the squad in making allowance for the errors when measuring angles of sight.

METHOD 2

6. State that, on active service, directors can be checked for angle of sight using a dial sight that is known to be in adjustment.

7. Demonstrate that the angle of sight to any distant object is measured with the dial sight. The director is then set up with the object glass level with the dial sight and the angle of sight to the object measured.

If the reading is the same as the reading of the angle of sight drum, the director is in adjustment. If not, the amount of error should be noted.

8. Practise the squad.

ADJUSTMENT

9. Tell the squad that all adjustments, must be carried out by an armourer.

/APPENDIX 1 .....

APPENDIX 1

BLANK FIRING ATTACHMENT

FITTING OF THE ATTACHMENT

1. The following are the components of the blank firing attachment :-

Barrel, Mark 2, drill purposes, blank.
Cone, front, muzzle attachment, blank.
Nut, adjusting, muzzle attachment blank,
Screw, adjusting, muzzle attachment, blank.
Spanner, muzzle attachment, blank.

2. The barrel is specially choked at the breech and is marked "DPB" on the trunnion block. The adjusting screw is screwed into the front cone from the rear, so that its large end may engage in the muzzle cup. The font cone with the adjusting screw assembles into the outer casing of the muzzle attachment in place of the existing front cone. The adjusting nut screws on to the projecting end of the adjusting screw and locks against the face of the front cone. The spanner is suitably arranged for the muzzle cap, adjusting screw and nut.

ADJUSTMENT OF THE GUN

3. The weight of the recoiling portions should not exeed 2 lb. The weight of the fusee spring should be about $4\frac{1}{2}$ lb.

The adjusting screw of the muzzle attachment should first be screwed inwards to the muzzle cup until it just begins to force the recoiling portions backwards. It should then be unscrewed $1\frac{3}{4}$ turns and secured in position by the nut. The screw may require further adjustment in order to obtain correct functioning, but in no case should the screw be less than 1 turn back from the muzzle cup. Adjustment should be made in $\frac{1}{4}$ turns.

FIRING

4. Service guns will be used for firing. A belt, preferably as regards size of pockets part worn, should be employed. The blank ammunition should be inserted crimped and flush with the front edge of the belt, in groups of 10 rounds. This number is sufficient for the purpose representing machine gun fire and also ensures a longer life of choke in the barrel. The barrel casing will be filled as for ball ammunition. When firing becomes noticeably irregular, the barrel will be set aside for examination by an armourer.

/CLEANING .....

CLEANING

5. On completion of blank firing, the guns will be immediately restored to their normal condition for firing ball ammunition. The gun will be cleaned in the normal way, (ie, as if ball ammunition had been used) except that no attempt will be made to clean their side of the barrel forward of the choke.

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APPENDIX 2

GUN AND BARREL TEST

INTRODUCTION

1. If during zeroing (See Lesson 10) the accuracy of the gun or barrel becomes suspect, these tests will be made in the order given :-

   a. The guage plug test, to see whether the barrel is safe to use.

   b. The barrel test.

   c. The gun test.

THE GUAGE PLUG TEST

2. The barrel is safe to use if :-

   a. The .306 plug will not go in more than 3.5 inches.

   b. The .307 plug will not go in more than .25 of an inch.

   c. The .301 plug will run the whole length of the barrel.

CONDITIONS FOR THE BARREL AND GUN TESTS

3. The range may be either 400 or 25 yards.

4. Before the test an armourer must examine the whole gun.

5. The light must be good and the weather calm.

6. The bore must be dry and clean, and warmers must be fired into the stop butt before the test.

7. The target is a plain white screen with a black patch 12 inches square (1 inch square at 25 yards),

THE BARREL TEST

8. A skilled marksman fires then single shots, taking the same aim each time. After each shot he knocks the gun off aim, and brings the sights up onto the mark below, so that any play in the elevating gear is always taken up in the same direction.

9. The barrel is fit for further use if :-

/ a. With .....

a. With Mark 7 ammunition, all ten shots hit inside a 24 inch square (a $1\frac{1}{2}$-inch square at 25 yards).

b. With Mark 8Z ammunition, at least nine of the shots hit inside a 30-inch square (a 2-inch square at 25 yards).

THE GUN TEST

10. A barrel that is known to be good must be used.

11. With Mark 7 ammunition, fire three ten-round automatic diagrams; all shots must hit inside a 36-inch square (a $2\frac{1}{2}$-inch square at 25 yds).

12. With Mark 8Z ammunition, fire four twenty-round automatic diagrams; disregard the worst diagram; at least 15 shots of each of the other three diagrams must hit inside a rectangle 36-inches wide and 54-inches high ($2\frac{1}{2}$-inches and $3\frac{1}{2}$-inches at 25 yards).

/APPENDIX 3 .....

APPENDIX 3

TESTS OF ELEMENTRY TRAINING

AIM

1. The following tests have been devised to assist officers in testing the efficiency of their men in elementary training. It is important that these tests should not be considered solely as competitions against time, for although speed is necessary, accuracy is the first essential. No man should therefore be passed as efficient unless all the points are correctly carried out, even though he may complete them in the standard time. Men who, whilst passing the tests for accuracy slightly exeed the standard time, should be tested again before being put back for further instruction.

NOTES FOR TESTING OFFICERS

2. The tests will be carried out in strict accordance with the detailed instructions given under the appropriate lessons, for unless the smalest details are insisted upon, the time limit will not be applicable. In carrying out tests time can be saved if the first detachment complete Tests 1 to 4 consecutively; the remainder can be carried out as convenient.

3. It should be noted in Tests 1,2,3 and 4 that number are being tested in their own particular duties as No 1 or No 2, and the tests should not be regarded as a test of the No 1 only.

Therefore, a man is not considered to have passed these test until he has passed in the duties of both numbers.

4. It is essential for each man to have passed all tests before proceeding with the machine gun course.

5. The conditions of the test will be carefully explained before the test begins, including the time allowed, and when the time allowance begins, and finishes. A timekeeper will be appointed. A stop watch should be used if available.

Stores required :- As laid down in the appropriate lessons. DP guns must be used for Tests 9, 10 and 11. In no circumstances will service guns be used.

/Name of tests .....

Name of test 1	Condition before test 2	Number of test 3	Time allowed 4	To Pass 5	Remarks 6
No 1 Mount gun (From the vehicle)	No's 1, 2 and 3. "Fall in" - "Mount." The vehicle to be not more than 8 yards from the place where the gun is to be mounted.	One	50 seconds from command "Gun" until No's are still.	All points of gun drill correct.	All numbers to be correctly seated in vehicle. No 3 to return to a position immediately in front of vehicle.
No 1A Mount gun (From the ground)	No's 1, 2 and 3 beside their stores. Stores laid out not more than 5 yards from the place where the gun is to be mounted.	One	25 seconds from command "Gun" until all Nos are still	All points of gun drills correct.	
No 2 Load	Gun mounted Belt packed in the liner. No's 1 and 2 take post.	One	5 seconds from the command "Load" until No 1 has got correct holding.	Gun correctly loaded.	
No 3 Unload	Gun mounted and loaded. No's 1 and 2 take post.	One	5 seconds from the command "Unload" until belt is correctly packed in liner	Gun correctly unloaded.	
No 4 Dismount gun (On to vehicle)	Gun mounted. No's 1, 2 and 3 take post.	One	40 seconds from the command "Gun" until all No's are still	All points of gun drill correct.	
No 4A Dismount gun	Gun mounted, No's 1, 2 and 3 take post.	One	20 secs from the command "gun" until all nos are still	All points of gun drill correct	

1	2	3	4	5	6
No 5 to adjust the sights and lay the gun.	The gun will be loaded. Three targets will be pointed out. Tangent sight lowered and set at any range. Nos 1 and 2 take post.	Three	12 seconds from the range being ordered until No 2 holds up his hand.	Sight set correctly and the aim accurate.	No 1 will not be informed of the order in which the target will be given out. Different ranges will be ordered for each target.
No 6 Traversing	Gun mounted 25 yards from the MG target and loade. No 1 will be given an opportunity to test his clamp, but the MG target will not be used for this purpose. Nos 1 and 2, take post.	Two	No time limit imposed.	When checked at any time to be within 15′ for direction. Elevation to be correct.	The test consists of traversing from right to left and from left to right. A complete row of oblique bulls will be traversed in each case. The order "STOP" will be given once, but not before the centre of the traverse have been reached. The aim will be checked after the order "STOP" and again when the end of the traverse is reached. Tapping back to correct errors is not allowed.
No 7 Controlled corrections ;- a Direct fire.	Gun mounted, loaded and laid on a target. Nos 1 and 2, take post.	Three	8 secs from the command. "Hundred" until No 1 presses the thumbpiece.	Sight correctly adjusted and correctly laid.	Corrections up or down will not exceed 300 yard
b. Indirect fire (Elevation).	Gun mounted and loaded, dial sight attached, aiming post put out. Range drum set at any range. Angle of sight drum at zero. The bubble will be central and a correct aim laid on the aiming post. No 1 and 2 take post.	Three	12 secs from the command "Hundred" until No 1 has pressed the thumbpiece.	Correct setting of the range drum and bubble level to within two minutes.	Corrections up or down will not exceed 300 yds The error in levelling the bubble will be ascertained by using the angle of sight drum.

1	2	3	4	5	6
.Indirect fire (Deflection)	As in b. Deflection drums and dial to be at zero at the beginning of each of the three tests.	Three	15 secs from the command "Minutes" or "Zero" until No 1 has retained his holding.	Correct setting on deflection drum Bubble central to within 2 minutes. Aim correctly relaid on aiming post.	Corrections right or left will not exceed 4 degrees, and will always include tens of minutes. Bubble checked by angle of sight drum. Two switches will be from zero and one cumulative.
o 8 laying the un for elevation ndirect.	Gun mounted, dial sight attached. All drums and deflection dial set at zero. Gun approximately level.	Three	15 secs from the command "Hundred" until No 1 has retained his holding.	Correct setting on the range and angle of sight drums. Bubble level to within 2 minutes.	Ranges ordered will be between 1,200 and 2000 yds. Angle of sight of not more than 1 degree plus or minus will be ordered and will include 5 min. In order that the time taken to give out the order will not interfere with the time allowed for the test, the angle of sight will be given immediately after the range.
o 9 Immediate ction	4 guns will be mounted about 3 yds apart. Stoppages set up crank handles covered and the guns laid off the aiming mark. The NCO at each gun will have a spare lock and clearing plug. One stoppage in each position will be set up. Special stoppages not to be include NOTE - The testin NCO to act as No 2.	One (Carry out immediate action on 4 guns).	No time limit imposed. Average time used in assesing points (See remarks).	Not less than 60 points.	The test consists of rectifying the stoppage of all 4 guns in turn. No 1 being tested will be warned that when he has carried out the immediate action on a gun he will immediately double to the next gun, until the last gun is reached. Time taken will be from the command "Go" until the testing NCO calls "Up" when the immediate action is complete on the last gun.

1	2	3	4	5	6
No 9. Immediate action - continued	-	-	-	-	The time taken by each individual is recorded and the average time worked out and points awarded as follows :- For every 5 secs or part of 5 secs below the average time add 1 point to points gained in immediate action . For 5 secs or part of 5 secs above the average time deduct 1 point. Total points awarded for correct immediate action carried out each gun-20. Deductions :- Totally incorrect : 20 points. Partially incorrect: 5 points. Guns not relaic : 5 points. Incorrect aim : 2 points. Minor error : 2 points. Not changing lock when required. : 10
No 10 Stipping and assembling the gun	Gun mounted with tools ready No 1 seated behind the gun.	One	2 min to sec'ds from command "Go" until No 1 presses the thumbpiece.	Stripped and assembled in the correct sequence and the correct manner.	The gun will be strippec down until the barrel has been removed and then assembled. The lock feedblock and component parts will not be stripped.

1	2	3	4	5	6
No 11 Stripping and assembling the lock.	Lock out of the gun with punch and T fixing pin at hand.	One	1 minute 40 sec 'ds from command "Go" until the lock is cocked.	Stripped and assembled in the correct sequence.	The lock will be stripped down until the sear is removed and then reassembled. The gun will not be stripped.

1	2	3	4	5	6
No 11 Stripping and assembling the lock.	Lock out of the gun with punch and T fixing pin at hand.	One	1 minute 40 secds from command "Go" until the lock is cocked.	Stripped and assembled in the correct sequence.	The lock will be stripped down until the sear is removed and then reassembled. The gun will not be stripped.

THE ARMY GYMNASIUM

MEDIUM MACHINE GUN : TERMINOLOGY
MEDIUM MASJIENGEWEER : TERMINOLOGIE

Abrasive	Skuurmiddel
Adapter for condenser	Stoomslangring
Adjustingnut for blank firing attachment	Stelmoer van loskruitstuk
Adjustingnut for connecting rod	Stelring van krukarm
Adjusting screw of fuzee spring	Stelskroef van sluitveer
Adjust the fuzee spring	Reël spanning van sluitveer
Adjust the traversing clamp to	Reël swaai (klem) weerstand
Aiming mark	Rigpunt
ALL DROP	ALMAL AF
All on Zero Lines	Almal op Zerolyne
ALL ADD	ALMAL OP
Ammunition Belt Box	Patroonbandkis
Arms of Crosshead	Wang van draagstuk
Arms of lockspring	Arms van slagveer
Arms of rear cross piece	Arms van sluitstuk
Auxillary packing gland	Hulpvoetstuk
Axis bush of side levers	Kniestukbus
Axis pin of bottom pawls	Spilpen van die keerpalle
Axis pin of cover lock	As van agterdeksel klem
Axis pin of trigger	Trekkeras
Axis pin of tumbler	Spanneras
Axis screwedpin of firing lever	Aspen van drukker
Axis screwedpin of safety catch	Aspen van veiligheidspal
Angle of sight	Terreinhoek
Barrel bearing guide	Looprus
Barrel casing	Watermantel

/Barrel .....

Barrel sleeve	Loopbus
Barrel trunnion block	Tapblok aan loop
Barrel trunnions	Looptappe
Bent of extractor levers for side levers	Verhoging aan uittrekkergeleier vir kniestuk
Bent for firing pin	Rus in slagpen
Bent of sear	Tand van russtaaf
Blast deflector	Lugslagbreker
Bent of tumbler	Bek van spanner
Bolt jamming elevating gear	Klembout van hoogtekoker
Bottom lever	Vertikale arm
Bottom plate of breech casing	Onderwand van agterstukkas
Bottom pawl axis pin	Splitpen van die keerpalle
Box of fuzee spring	Sluitveerkas
Bracket of checklever	Voetstuk vir aanslagklink
Breech casing ribs	Riggels in agtersukkas
Bridge of rear cover	Voetstuk op agterdeksel
Bush of handwheel	Handwiel bus
Cams right and left	Regter en linker geleidings
Cannelure	Kartelgroef
Casing of muzzel attachment	Trompstukbus
Catch of front cover	Voordekselwerwel
Check for crest clearance	Toets vir kruinvryheid
Clamingscrew of direction dial	Breedteklemskroef
CLEAR GUN	WAPEN LEEG
Clutch plate	Klouvlak
Collar	Opsluiering
Condenser tube	Stoomslang
Condenser can	Stoomvanger
Cone of Muzzle attachment	Trompstukkap
Connecting rod	Krukarm
Consistency of tap	Egalige palmslag

/Cup .....

Cup of Muzzle attachment	Trompskottel
Crosshead	Draagstuk
Concentrated fire	Gemonsentreerde vuur
Detachment	Wapenbediening
Dial	Breedteplaat
Disc of Muzzle attachment	Tropstukskyf
Dismount gun	Wapen af
Dialsight bracket	Panoramavisier draagstuk
Elementary handling	Elementêre bediening
Elevating gear tumbler	Elevasie hoogte koker
Elevating joint pin	Elevasie sluitpen
Elevation bracket	Hoogte stel skroef
Extractor horns	Uittrekkernokke
Extractor stop of lockcasing	Uittrekkerstuitnok aan slotkas
Feather of tumbler	Ruggies van koker
Feather on joint pin	Sluitpenspy
Feed block	Bandvoerder
Feedblock slide	Skuifstuk van bandvoerder
Fire lever	Drukker, Vuurhefboom
Firing pin	Slagpen
Firing lever axis screwed pin	Drukkeraspen
Firing lever pawl	Drukkernok
Firing lever shaft	Vuurhefboomas
Firing pin bent	Slagpen rus
Fixed line	Uitgesette skootslyn
Firing lever thumbpiece	Drukkerblad
For indirect fire mount gun	Vir indirekte vuur wapen op
Friction of recoiling positions	Klemming van loop
Front cover	Voordeksel
Front cover catch	Voordekselwerwel
Fuzee	Sluitverrrol
Fuzee spring adjusting screw	Stelskroef van sluitveer

/Fuzee .....

Fuzee spring hook	Sluitveerhak
Fuzee stem	As van sluitveer rol
Front legs	Voorpote
Gib	Patroonhak
Gib spring	Patroonhak veer
Gland of muzzle attachment	Trompstuk voet
Grooves in extractor	Groewe in uittrekker
Gun chest	Wapenkis
Group commander	Groepsbevelvoerder
Hang the lock to	Die slot laat vashaak
Hardextraction	Stram patroon uittrekking
Head of side levers	Buis van kniestuk
HOrns	Nokke
Indicator bar	Wysbalk
Instructional lock	Instruksie slot
Jamming handles	Klemhandvatsels
Jamming bolt	Klembout
Jamming block	Klemblok
Joint pin	Sluitpen
Joint stud	Vaste as
Key of tumbler axis pin	Spy van spanneras
Lever of extraction	Uitrekker geleier
Lock casing	Slotkas
Lock guides	Slotriggels
Lock spring	Slagveer
Lock	Slot
Left slide	Linker systuk
Limitations	Beperkings
Line of fire	Skootslyn
Mount	Opklim
Muzzle blast	Tromp lugslag

/Muzzle .....

WEAPON TRAINING POSTERS

These are available :

No and Title of Poster	WO Code No	Lesson to which applicable
No 28, Vickers MG MK I	8786	1
No 29, Position of the lock	8787	48, 13, 16, 18
No 30, Feed block	8788	14, 15
No 31, Barrel casing	8789	1
No 32, Dial sight	8790	53

GLOSSARY OF TERMS USED IN THIS PAMPHLET

Angle of sight

The angle between the line of sight and the horizontal plane. The angle is set to be plus when the target is above the horizontal plane and minus when the target is below it.

Crest clearance angle

The angle by which the barrel must be raised above the line of sight to the crest to ensure that all the bullets will clear the crest.

Deflection

A lateral displacement of the lines of any, or all, guns.

Direct fire

When the gun is laid directly on the target by means of the backsight and foresight.

Fixed line

A term denoting that measures have been taken for maintaining elevation and direction in darkness, etc, to ensure that fire will fall in the pre-anranged area of ground.

Flanking fire

Fire applied across the front of a locality occupied by own troops, or, if they are advancing, at an angle to their line of advance.

Group angle

The angle between the line of sight to the target and the line of sight to own troops when using overhead fire.

Group commander

An officer of NCO commanding two or more machine gun sections.

Indirect fire

When a gun is laid to hit a given target by other means than by laying on it direct.

Line of fire

The direction of the tarbet from the gun.

/Minimum .....

Minimum clearance

A term used to denote the minimum height of the centre bullet of the cone above the heads of our own troops for the latter to be safe.

Near limit of arc

The nearest line across the arc of fire on which fire may be required.

Overhead fire

Fire passing over the heads of our own troops.

Pivot gun

The gun used as a basis for calculation.

Quadrant angle

The angle which the axis of the barrel makes with the horizontal plane.

Quadrant elevation

The quadrant angle expressed in terms of range and an angle of sight.

Registering

The recording of the direction and elevation necessary to hit any given target as found by ranging.

Safety angle for flanking fire

The minimum lateral angle by which fire must clear own troops for them to be safe.

Safety angle for overhead fire

The minimum angle which must be included between the axis of the barrel and the line of sight to own troops to ensure their safety under overhead fire.

Tangent angle

The angle which the axis of the barrel makes with the line of sight.

Zero line

A line of reference on which all guns are parallel and from which switches are measured.

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